SPIXIANA	11	3	205–242	München, 30. April 1989	ISSN 0341–8391

Records, descriptions, and revisionary studies of Acrididae from Thailand and adjacent regions

(Orthoptera, Acridoidea)

By **S. Ingrisch**

Abstract

A report on new and interesting Acrididae recently collected in Thailand is given. In the course of the study, reexamination and revision of previously described species were necessary. Three genera, eight species, and one subspecies, all from Thailand, are new to science. One genus, two species, and one subspecies previously described from Burma and Yunnan become synonyms. For seven species known from the Indo-Malayan region *(Bettotania maculata* C. Willemse, *Carsula tenera* Brunner, *Ceracris fasciata* (Brunner), *Chlorophlaeoba tonkinensis* Ramme, *Oxytauchira aurora* (Brunner), *Paragonista infumata* C. Willemse, and *Parastenocrobylus borneensis* C. Willemse), the phallic complex is described for the first time. Keys to the species of *Carsula, Oxytauchira* from Burma and Thailand, *Bettotania*, and *Paragonista* are included. New faunistic data on some species are added.

New descriptions: *Bettotania asymmetrica* spec. nov., *Carsula bicolor* spec. nov., *Chlorophlaeoba tonkinensis siamensis* subspec. nov., *Oxycrobylus agilis* gen. nov. + spec. nov., *Oxytauchira aspinosa* spec. nov., *Oxytauchira bilobata* spec. nov., *Paragonista hyalina* spec. nov., *Squamobibracte doipui* gen. nov. + spec. nov., *Striatosedulia pluvisilvatica* gen. nov. + spec. nov.

New synonyms: *Rammeacris* C. Willemse, 1951 = *Ceracris* Walker, 1870, *Ceracris gracilis* Ramme, 1941 = *Ceracris fasciata* (Brunner, 1893), *Ceracris fasciata szemaoensis* Cheng, 1977 = *Ceracris fasciata* (Brunner, 1893), *Chlorophlaeoba longusala* Zheng, 1982 = *Chlorophlaeoba tonkinensis* Ramme, 1941.

Introduction

Numerous species of Acridoidea may damage agricultural crops, namely in tropical and subtropical countries. The harmful grasshopper species usually belong to the best studied insects in a certain region. On the other hand, many more species have a very restricted ecological potential and limited range of distribution. Those species usually occur in the more natural landscapes. They can be used as indicators for environmental quality. As deforestation and devastation proceeds enormously in the tropical countries (e. g. Deshmukh 1986), the possibility for studying the diversity of the insect fauna in natural habitats decreases.

With regard to Thailand, a comprehensive guide to the locusts and grasshoppers of economic importance has been published recently (Roffey 1979). Apart from the economically important species, the knowledge of the Acridoidea of Thailand is very poor, even if compared with nearby countries as India, China, Malaysia or Indonesia. The synopsis of the Acridoidea of the Indo-Malayan and adjacent regions by C. Willemse (1951–1957) includes Indochina but names only few records of Thailand. This synopsis is still the most useful for determination of Acridoidea of the eastern oriental region.

In the present paper new taxa of the Acrididae collected during own excursions to Thailand in 1985–1987 are described. Additionally, faunistic data of a few species not included in Roffey (1979)' are given. Most of the new taxa have been compared with type material of similar, known species. I

use the opportunity to describe the – previously neclected – phallic complex of those species from type material, and to revise a few species as necessary.

The suprageneric classification of the Acridoidea has not settled yet. The system of VICKERY + KEVAN (1983) seems to be the most appropriate at the present knowledge and is adopted here. It is mainly based on the studies of DIRSH (1961, 1975), the main difference being the Catantopidae and the Acrididae of DIRSH (1975) treated as a single family Acrididae, including the old world groups of Hemiacrididae but excluding the American Romaleidae. The division of the Acrididae into subfamilies is still unsatisfactory. As the system is mainly based on African and Holarctic grasshoppers, it leaves many oriental genera unassigned. A comprehensive study of the phallic complex of the previously described genera would be necessary to provide an extended classification.

Methods

The male internal genitalia provide the most useful taxonomic characters at specific level in many subfamilies of the Acrididae, while in a few others (e. g. Acridinae s. str., Locustinae or Gomphocerinae) they are hardly useful to separate the subfamilies. It should however be remembered that also the phallic complex is due to individual variation. KEVAN + LEE (1974) have even shown that its form can change in adult grasshopper with age. Small differences in shape – especially when compared with drawings of other authors – should thus not be overestimated. The terminology with regard to the phallic complex is adopted from DIRSH (1975).

Drawings were made with a Wild M5 microscope and a drawing mirror. For avoiding distortion by drying, the phallic complex was stored in 70% alcohol, and kept under water while making the drawings. It is now mounted on cardbord with water-soluble adhesive and pinned with the grasshopper on the same needle.

Material and acknowledgements

This study is mainly based on own collections. The collectors' name is only given for loaned specimens. Depositories with their abbreviations as used throughout the text are as follows: MNHB, Museum für Naturkunde der Humboldt-Universität, Berlin; MSNG, Museo Civico di Storia Naturale, Genova; NMM, Collection C. Willemse, Natuurhistorisch Museum, Maastricht; ZSM, Zoologische Staatssammlung, München. Where no depository is given, the specimens are in my own collection.

For the loan of material many thanks are due to Mrs. F. M. Dingemans-Bakels (Maastricht), Dr. K. K. Günther (Berlin), and Dr. R. Poggi (Genova). I am very grateful to Dr. F. Willemse for helpful discussions and for offering his collection for comparisons.

Explanation of symbols used in the figures (for details see DIRSH 1975).

a) phallic complex without epiphallus

Ac	arch of cingulum
Ap	apical valves of penis (= aedeagus)
Apd	apodemes
Bp	basal valves of penis (= endoparameres, endophallic plates)
Cv	valves of cingulum
dpp	dorso-posterior process of rami
Esd	dorsal ectophallic sclerite
Esv	ventral ectophallic sclerites
Fx	flexure
Gpr	gonopore processes
Lp	lateral plates of basal valves of penis
M	membrane

Pl zygomal plate
Rm rami of cingulum
Rms membranous projection of rami
Sh ectophallic sheath of penis
Sh-Ap sheath covering apical penis valves
Sh-Cv sheath covering cingular valves
Sps spermatophore sac
Vap ventro-apical projection
Zyg zygoma

b) epiphallus

A ancorae
An anterior projections
B bridge
Il inner lophi
L lophi
Ol outer lophi
Os oval sclerites
Pp posterior projections

c) other abbreviations

C cercus
S subgenital plate
Sa supra anal plate
10. T tenth tergum

Euthyminae (= Hemiacridinae)

Carsula Stål, 1878

Carsula Stål, 1878: 53, 100.
Carsula C. Willemse 1955: 24 (see this paper for further citations, synonymy, and generic diagnosis).
Carsula Zheng 1981: 295, 303.
Carsula Zheng, 1983: 409, 411.
Carsula Huang, 1985: 212–214.

Typus generis: *Carsula sulcipes* Stål, 1878: 100, by monotypy.

Tentative key to the species of *Carsula*

1. Tegmina with 22–28 regular transverse veinlets in radial area 2
– Tegmina with 6–19 regular transverse veinlets in radial area 3
2. Tegmina reaching beyond four fifth of hind femora. Yunnan. . . . . *yunnana* Zheng, 1981
– Tegmina only reaching to the middle of hind femora. Cercus of ♀ very short. Yunnan. . . . . *brachycera* Huang, 1985
3. Tegmina reaching to apex of hind femora. Philippine Islands. . . . . *sulcipes* Stål, 1878
– Tegmina shorter 4
4. Tegmina reaching distinctly beyond the middle of hind femora (in ♂ almost reaching the hind knees). Subgenital plate and Cerci as in figs 9–10, apex of phallic complex as in figs 11–12. Burma. . . . . *tenera* Brunner, 1893
– Tegmina only reaching the middle of hind femora or shorter 5

5. Tegmina with 6–12 regular transverse veinlets in radial area. Somewhat smaller species (hind femora of ♂ 12–14 mm). Shape of epiphallus, zygoma, cingular valves, and apical valves of penis different from the following species (see figs 5–6 in HUANG 1985). Yunnan. . . . . *brachyptera* Huang, 1985

– Tegmina of ♂ with 14–19 regular transverse veinlets in radial area. Somewhat larger species (hind femora of ♂ 15.5 mm). Epiphallus as in figs 4–5, phallus as in figs 1–3. Northern Thailand . . . *bicolor* spec. nov.

Carsula tenera Brunner, 1893
(figs 9–12)

Carsula (?) *tenera* Brunner, 1893: 157, pl. V, fig. 53.
Carsula tenera C. WILLEMSE 1955: 25 (see this paper for synonyms).

Holotype: ♂, Burma: Carin Cheba, 900–1 100 m, VI. 1888, L. Fea, MSNG.
Material studied: Only the holotype was examined.

Description

See description and measurements in C. WILLEMSE (1955).

Male. Tenth tergum lateral, furculae only indicated. Supra anal plate triangular with a median furrow and with indication of lateral carinae ending before the apical flap, apex subacute. Cerci longer than subgenital plate, ventral margin substraight, dorsal margin curved, apex subacute. The terminal abdominal sterna with long dense hair on both sides of the middle. Subgenital plate with a transverse fold, hairy, slender, conical, apex pointed. Hind tibia very hairy, especially dorsal area in basal half.

The type has been filled with cotton wool and only the apex of the phallic complex left. It is supposed that the remains of the phallus represent the apices of the cingular valves and the apical penis valves (figs 11–12).

Distribution: Only known from the type locality in Burma.

Carsula bicolor spec. nov.
(figs 1–8, 13)

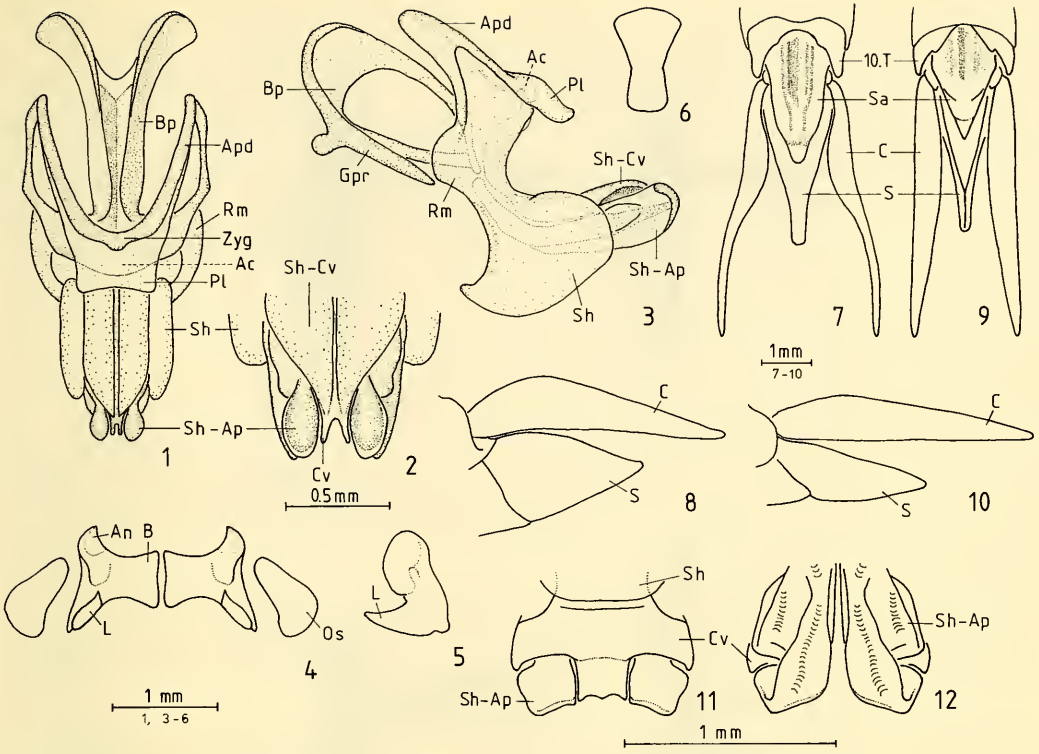
Holotype: ♂, Northern Thailand, Doi Chiang Dao, mountain forest and old fields, 4.–7.VI. 1986, ZMS.
Material studied: The type is unique.

Description

Body slender, elongate. Antennae about as long as head and pronotum together, inserted near the top of fastigium, in a great distance from the eye, basal joints slightly ensiform, margins of antennae tapering towards the pointed apex. Frontal ridge in the upper half with the margins connected and forming a keel, in the lower half slightly widening towards the clypeus. Fastigium of vertex long, separated from the vertex by a transverse sulcus in front of the eyes, its margins narrowed in front, with indication of a median carinula, apex rounded. Vertex long and elongate, with indication of a median carinula, and with rows of points on each side.

Pronotum finely punctate, longer than broad, cylindrical, anterior margin rounded-truncate, posterior margin rounded; disc with indication of a median carina, lateral carinae absent; principal sulcus in the middle of the seventh tenth of pronotal length. Prosternal process short, apex widened, blunt, shaped as in fig. 6. Mesosternal lobes longer than broad, contiguous, posterior margin rounded. Metasternal lobes longer than broad, contiguous. Sternits hairy, the terminal four with tufts of dense hair on both sides of the middle.

Tegmina almost reaching the middle of the hind femora, anterior margin slightly widened basally, margins tapering towards the apex; radial area behind the middle of tegmen with 14–19 regular trans-

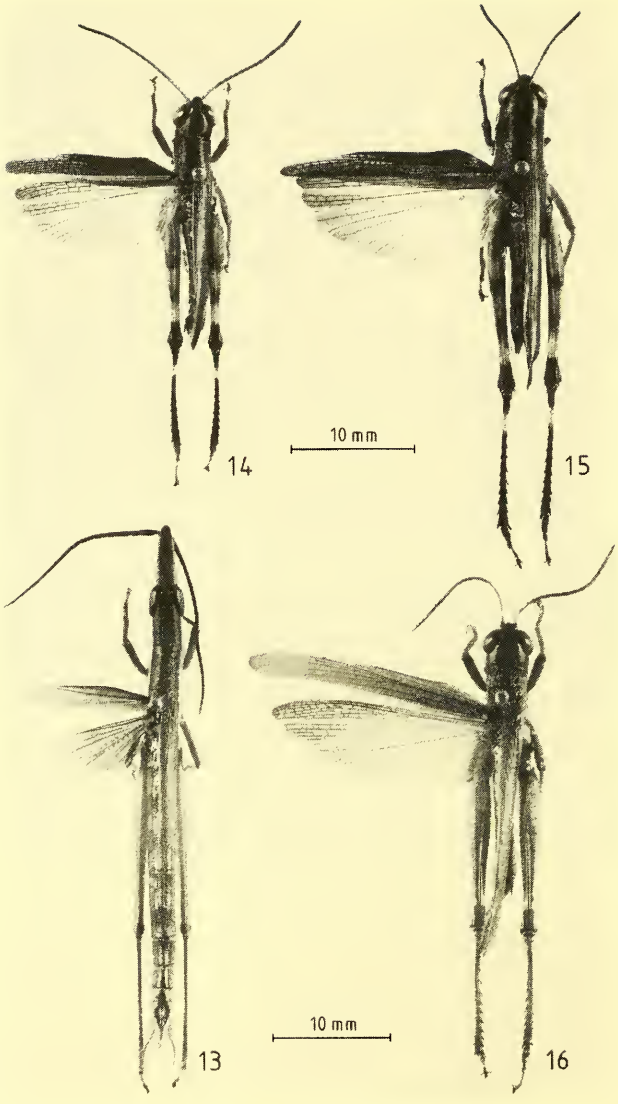


Figs 1–8 *Carsula bicolor* ♂ (holotype): 1. phallus in dorsal view; 2. apex of the same twice as much enlarged; 3. phallus in lateral view; 4. epiphallus in dorsal view; 5. do. in lateral view; 6. prosternal process in ventral view; 7. apex of abdomen in dorsal view; 8. do. in lateral view. Figs 9–12. *Carsula tenera* Brunner ♂ (holotype): 9. apex of abdomen in dorsal view; 10. do. in lateral view; 11. apex of the remains of the phallic complex in dorsal view; 12. do. in ventral view.

verse veinlets (their number differs on both sides). Flexed hind wings about 2 mm shorter than tegmina. Anterior and median legs short, hairy below. Hind femur slender, distinctly shorter than abdomen, margins smooth, hairy below; hind knee with ventral lobes obtusely pointed. Hind tibia with 20–22 internal and 12–14 external preapical spines, internal and external apical spine present; internal area and basal half of dorsal area with long and dense hair. Second joint of hind tarsus shorter than first, arolium large.

Male. Tenth tergum continuous; furculae absent, but margins very slightly bulging. Supra-anal plate elongate, with a median furrow in basal half; apical flap lingualate, weak, apex subtruncate. Cerci compressed, surpassing the subgenital plate, ventral margin weakly, dorsal margin strongly curved, apex pointing. Subgenital plate elongate, with a transverse fold, apex subacute.

Epiphallus divided, without anchorae, anterior projections in dorsal view about semicircular; lophi extending, in lateral view triangular, upcurved, apex obtusely pointed; oval sclerites large but weakly sclerotised. Apodemes short. Zygoma with a caudal process projecting over the arch of cingulum. Rami connected with arch of cingulum, both connected without clear borders with great ectophallic sheaths. Penis valves completely divided into basal and apical ones, both closely narrowed but interrupted by a short gap. Cingular valves covered laterally and ventrally by the apical penis valves, apical part undivided but with paired, membranous, dorsal sheaths. Apical penis valves covered by membranous sheaths, apex flexed. All sheaths with granular surface.



Figs 13–16 13. *Carsula bicolor* spec. nov. ♂ (holotype); 14–15, *Oxytauchira bilobata* spec. nov. (14, ♂ holotype; 15, ♀ allotype); 16, *Oxycrobylus agilis* gen. nov. + spec. nov. ♂ (holotype).

Colouration. Antennae and dorsum from fastigium to supra anal plate, including tegmina, medium to reddish dark brown, laterally bordered by a narrow blackish brown stripe from the hind margin of the eye along dorsal margin of paranotum and ventral margin of tegmen, also on the corresponding hidden part of the pleurum, it is for his part bordered by a whitish stripe on occiput, paranotum and pleurum. Rest of the body (= ventro-lateral and ventral parts) green. Cerci red. Hind wings infumate.

Female unknown.

Measurements (mm): ♂: body 46; antenna 16; fastigium of vertex 5.3; pronotum 5.4; tegmen 12; hind femur 15.5.

Discussion

The divided penis valves and the presence of regular stridulatory veinlets in the radial area of tegmina give evidence that the genus *Carsula* belongs to the Euthyminae (= Hemiacridinae). The elongate shape of the body and the short interspace between the basal and apical penis valves are typical for the tribe Leptacridini. Differential features of the known *Carsula* species are the phallic complex, abdominal apex, number of regular veinlets in radial area of tegmen, and length of tegmen.

Distribution

Only known from the type locality in the mountains of northern Thailand.

Oxyinae

Oxytauchira Ramme, 1941

Oxytauchira Ramme, 1941: 117.
Oxytauchira Hollis 1975: 200, 204.

Type-species: *Tauchira gracilis* C. Willemse, 1931, by monotypy.

Diagnosis

See description in Hollis (1975). The transverse prosternal process can be either trilobate as indicated by Hollis (c. f.), bilobate, or bilobate with the indication of a third lobe in the middle. The external apical spine of the hind tibia is present in most species, but absent in one of the new species described below.

Discussion

The phallic complex of the four species at hand is very similar, differing only in secondary characters. They are thus surely congeneric. The type-species of *Oxytauchira* has been described from two females from Sulawesi. It is thus somewhat questionable if *O. aurora* Brunner, 1893, from Burma really belongs to the same genus as indicated by Hollis (1975). Already F. Willemse (1965) made reservations when he described a new species in the genus *Oxytauchira (elegans)* after one male from Java. A final decision will be possible when the male of *O. gracilis* from Sulawesi is discovered.

Oxytauchira is close to *Tauchira* Stål, 1878, differing in the absence of parallel stridulatory veinlets in the radial area of the tegmen. Additionally, the external apical spine of the hind tibia is usually present, while it is usually absent in *Tauchira*. A problem is the differentiation of *Oxytauchira* from *Sinstauchira*, described by Zheng (1981) from Yunnan. After the original diagnosis it differs in exactly the same characters from *Tauchira* as those described by Hollis (1975) for *Oxytauchira*. Unfortunately, Zheng (1981) does not state the differences between *Sinstauchira* and *Oxytauchira*, although in the same publication he also describes a new species of *Oxytauchira*. From his figures it seems possible that the male abdominal apex differs between both genera, the tenth tergum of *Sinstauchira* lacking furculae. This is however not always true in species described under *Sinstauchira* by Chinese authors subsequently.

Key to the species of *Oxytauchira* from Burma and Thailand

1. Prosternal process trilobate (fig. 43). Hind femora exept for the dark knees without black markings (fig. 25). Cerci of male with a small dorso-internal preapical tooth (fig. 30). Burma. *aurora* (Brunner, 1893)

– Prosternal process bilobate (figs 44–45). Hind femora either with dark hind knees and additional black markings or hind knees concolourous. Cerci of male either simply conical or apex with two lobes of equal length 2

2. Cerci of male with apex bilobate (fig. 29). Hind femora with black markings as in fig. 26. Central Thailand. ..... *bilobata* spec. nov.

– Cerci of male with apex conical (fig. 42). Markings on hind femora different 3

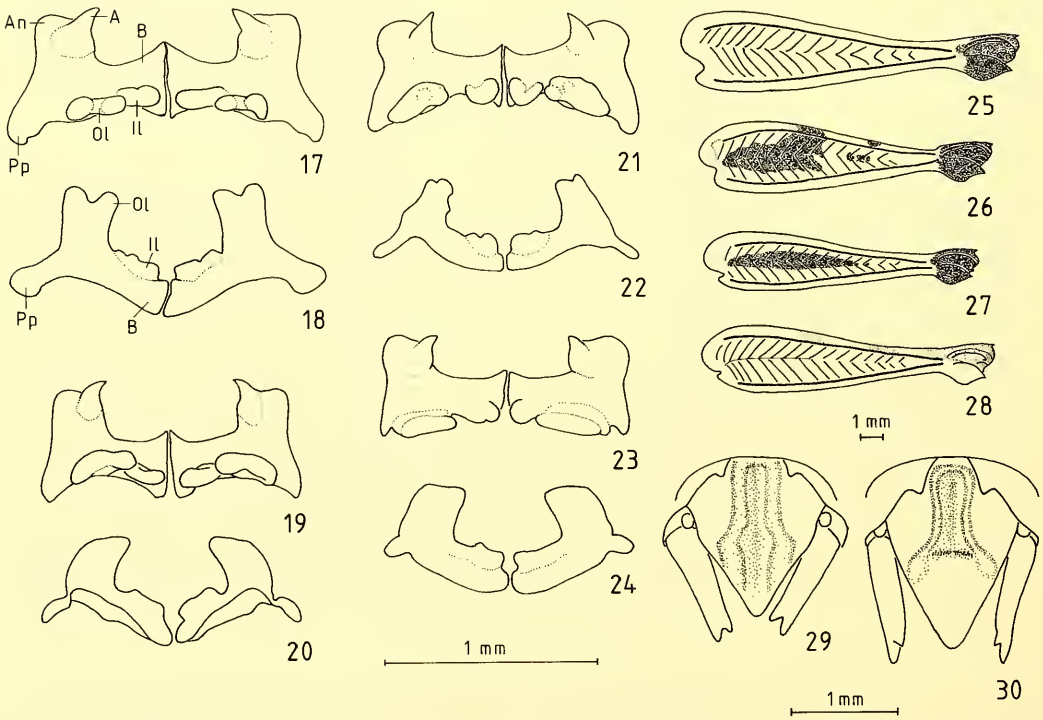
3. Hind knees concolourous (fig. 28). Tegmina reaching or surpassing the top of hind femora. Outer lophi of epiphallus oblique-rectangular (fig. 24). Northern Thailand ..... *aspinosa* spec. nov.

– Hind femora with a longitudinal black stripe, hind knees blackish-brown (fig. 27). Tegmina not reaching the hind knees. Outer lophi of epiphallus bilobate (fig. 22). Yunnan to Northern Thailand. ..... *brachyptera* Zheng, 1981

Oxytauchira aurora (Brunner, 1893)
(figs 17–18, 25, 30–31, 36, 38, 43)

Racilia aurora Brunner, 1893: 155, Tab. V, fig. 53.
Oxytauchira aurora Hollis 1975: 204, fig. 30.

Holotype: ♂, Birmania, Teinzo, V.1886, L. Fea, MSNG.
Material studied: Only the holotype was examined.



Figs 17–30 *Oxytauchira* Ramme: 17–24, epiphallus (oval sclerites not drawn) in dorsal view (first figure) and in posterior view (second figure) of 17–18. *aurora* Brunner (holotype); 19–20. *bilobata* spec. nov. (holotype); 21–22. *brachyptera* Zheng (Doi Suthep); 23–24. *aspinosa* spec. nov. (holotype); 25–28. external aspect of left hind femur of ♂ of 25. *aurora* Brunner (holotype); 26. *bilobata* spec. nov. (holotype); 27. *brachyptera* Zheng; 28. *aspinosa* spec. nov.; 29–30. tenth tergum, supra anal plate and cerci of 29. *bilobata* spec. nov. (holotype); 30. *aurora* Brunner (holotype).

Redescription of holotype

Head conical. Face rugose, in profil almost straight. Fastigium of vertex semi-ovoid, separated from the vertex by a slight depression. Frontal ridge distinct throughout, margins weak below the median ocellus. Ratio interocular distance : eye-length about 1:3 (0.8:2.6 mm); interocular distance broader than frontal ridge. Antennae filiform, longer than head and pronotum together. Prosternal process transverse, flattened, widening apically, apex trilobate. Pronotum rugose, disc almost flat, crossed by three shallow transverse sulci, the first interrupted in the middle; median carina weak, lateral carinae absent. Mesosternal lobes very sligtly broader than long, mesosternal interspace longer than wide; metasternal lobes contiguous. Tegmina reaching (or slightly surpassing) the apex of the hind femora, costal area with a basal expansion, apical fourth strongly tapering, apex rounded; venation unspecialised. Hind femur moderately slender; dorsal carina smooth and terminating in a small spine; ventral geniculars lobes strongly acute. Posterior tibia moderately expanded, apically with acute dorsal margins, 9 inner and 7 outer preapical spines, inner and outer apical spine distinct.

Male. Tenth tergum with small furculae. Supra anal plate long-triangular, medially grooved in basal half, apical half flat, apex obtuse. Cerci compressed, straight, with a small preapical tooth on dorso-interior edge, apex obtusely pointed. The three apical sterna with tufts of long and dense hair medially on each side. Subgenital plate with a transverse fold, conical, apex obtuse.

Epiphallus divided; ancorae hook-shaped; outer lophi extending in a 90°-angle, in posterior view with almost parallel margins, apex bilobate; inner lophi small. Oval sclerites present. Ectophallic membrane thickened ventrally to form an arcuate sclerite (not drawn in fig. 36). Cingulum with zygoma, rami and apodemes; apodemes lamellate; zygoma with a short, rounded, apical projection on both sides of the middle. Rami each with a dorso-posterior process, connected with membranous sheaths covering the apical penis valves ventro-apically. Ventral side of zygoma joined with the arch. Apices of cingular valves and apical penis valves covered by weakly sclerotised sheats, that form complex structures as in fig. 38. Basal and apical valves of penis connected by a curved, unbroken flexure.

Female. See description in Brunner (1893).

Colouration. Antennae ivory-yellowish, darker at apex. Frons dark brown; genae ivory white with a dark brown stripe from the compound eye to and along the ventral border of the genae. Vertex, occiput, and pronotal disc dark brown with light bands bordering the fastigium, then running along the inner margin of the compound eyes and straight back, bordering pronotal disc and continuing on tegmina. Paranota dark brown above, ivory white below the middle, dark brown at the inferior margin. Tegmina dark brown with a whitish stripe along the cubital veins, anterior margin whitish in apical fourth, anal area light brown. Hind wings transparent, slightly infumate. Pleurae dark brown with ivory white markings. Abdominal terga dark brown medially, yellowish laterally and along the hind margins. Prosternal process and sterna yellowish. Fore and mid legs light green. Hind femur light green, about apical third red, hind knees dark brown. Hind tibiae basally dark brown with a blueish spot above, followed by a light blueish-green ring, rest blueish-infumate; spines blackish-brown. Hind tarsi blueish.

Measurements (mm): ♂: body 23; antenna 13; pronotum 4.6; tegmen 16.5; hind femur 13.

Discussion

Dirsh (1956) and Hollis (1975) figure the epiphallus of what they believe to be *O. aurora*, but only the dorsal aspect that does not show the shape of the lophi. Since the genus is now known to contain several superficially similar species in Thailand and southern China, it is not certain wether they really studied *O. aurora* or another species.

Distribution

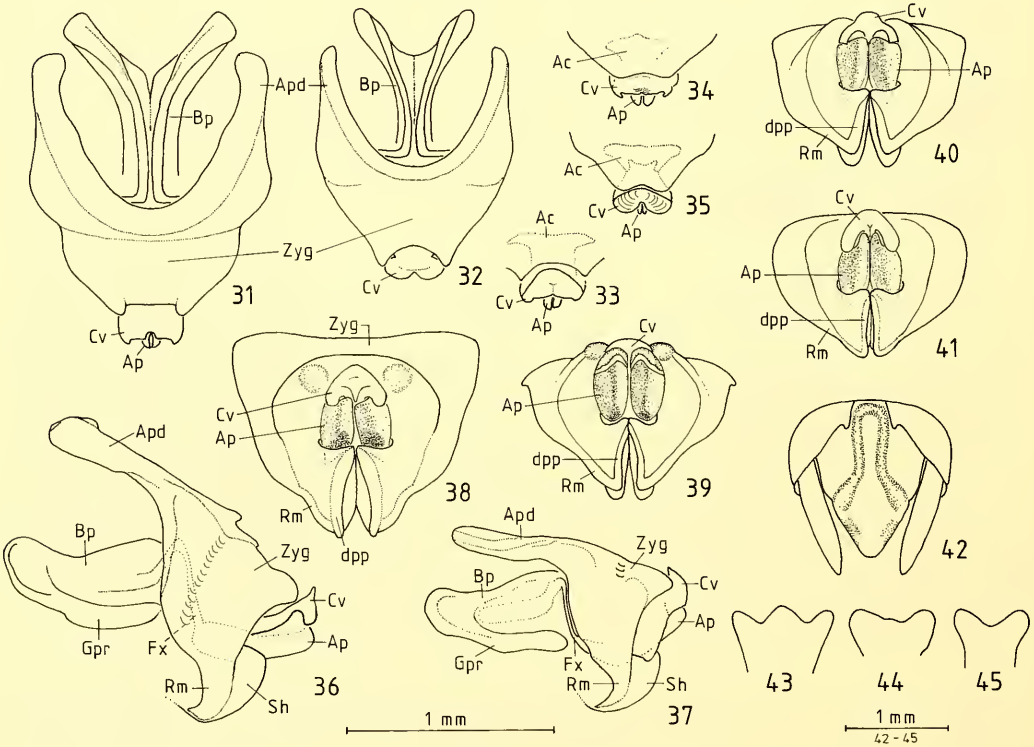
With certainty only known from the type locality in Burma.

Oxytauchira bilobata spec. nov.
(figs 14–15, 19–20, 26, 29, 32–33, 37, 39, 44)

Holotype: ♂, Central Thailand, Khao-Yai, 7.IV.1985, ZSM. – Paratypes: 2 ♀, same data as holotype, allotype in ZSM.

Description

Head conical. Face rugose, in profil almost straight. Fastigium of vertex short semi-ovoid, separated from the vertex by a slight depression. Frontal ridge distinct throughout, ridges weak below the median ocellus. Ratio interocular distance: eye-length about 1:4 (0.6:2.5 mm) in male, 1:3.5 (0.9:2.6 mm) in female; interocular disctance broader than frontal ridge. Antennae filiform, in male longer, in female slightly shorter than head and pronotum together. Prosternal process transverse, flattened, widening apically, apex bilobate with wide interspace. Pronotum rugose, disc almost flat, crossed by three distinct transverse sulci; median carina weak, lateral carinae absent. Mesosternal lobes very sligtly broader than long, mesosternal interspace longer than broad; metasternal lobes contiguous.



Figs 31–45 *Oxytauchira* Ramme. 31–32. phallus in dorsal view of 31. *aurora* Brunner (holotype); 32. *bilobata* spec. nov. (holotype); 33. apex of phallus of *bilobata* spec. nov. in posterio-dorsal view; 34–35. apex of phallus in dorsal view of 34. *brachyptera* Zheng (Doi Suthep); 35. *aspinosa* spec. nov. (holotype); 36–37. phallus in lateral view of 36. *aurora* Brunner (holotype); 37. *bilobata* spec. nov. (holotype); 38–41. phallic complex in posterior view of 38. *aurora* Brunner (holotype); 39. *bilobata* spec. nov. (holotype); 40. *brachyptera* Zheng; 41. *aspinosa* spec. nov. (holotype); 42. tenth tergite, supra anal plate and cerci of *aspinosa* spec. nov. (holotype); 43–45. prosternal process of ♂ in anterior view of 43. *aurora* Brunner; 44. *bilobata* spec. nov.; 45. *aspinosa* spec. nov.

Tegmina reaching or slightly surpassing apex of hind femora, costal area with a basal expansion, apical third tapering, apex rounded; venation unspecialised. Hind femur moderately slender; dorsal carina smooth and terminating in a small spine; ventral genicular lobes strongly acute. Hind tibia moderately expanded apically with acute upper margins, 9 inner and 8 outer preapical spines, inner and outer apical spine distinct.

Male. Tenth tergum with small furculae. Supra anal plate triangular with a spoon-shaped median groove, apex obtuse. Cerci slightly compressed, straight, apex bilobate. The three apical sterna with tufts of long and dense hair on both sides of the middle. Subgenital plate with a transverse fold, conical, apex obtuse.

Epiphallus divided; ancorae hook-shaped; outer lophi extending in a 90°-angle, in posterior view gently incurved, apex obtuse-triangular; inner lophi small. Oval sclerites elongate. Cingulum with zygoma, rami and apodemes; apodemes lamellate; zygoma with a short, obtusely pointed, apical projection on both sides of the middle. Rami each with a dorso-posterior process, connected with membraneous sheaths covering the apical penis valves ventro-apically. Ventral side of zygoma joined with the arch. Apices of cingular valves and apical penis valves covered by weakly sclerotised, almost hyaline sheaths that form complex structures as in fig. 39. Basal and apical penis valves connected by a curved, unbroken flexure.

Female. Supra anal plate in basal half rhomboid with central part elevated and slightly grooved, declining step-like to the flat, long-triangular apical half; apex obtuse. Cerci long-conical, apex obtusely pointed. Subgenital plate simple, apex broadly rounded and weakly projecting medially; like the preceding sternum with an area of dense, long hairs on both sides of the middle. Ovipositor short, apices of dorsal and ventral valves hooked; dorsal valves with 2–4, ventral with 5–6 teeth.

Colouration. Antennae red with blackish tips. Frons brownish; genae ivory white with a dark brown stripe from the compound eye to and along the ventral border of the genae. Vertex, occiput, and pronotal disc with a dark brown median band and with light bands bordering the fastigium, than running along the inner margin of the compound eyes and straight back, bordering disc of pronotum and continuing on tegmina; occiput behind the compound eyes blackish-brown. Paranota blackish-brown above, ivory white below the middle, dark brown at the inferior margin. Tegmina dark brown with a whitish stripe along cubital veins, anterior margin whitish in apical third. Hind wings transparent, infumate in apical half and along the borders. Pleurae blackish-brown with ivory white markings. Abdominal terga blackish-brown medially, yellowish laterally and along the hind margins; part of the terga with additional dark markings. Prosternal process and sterna yellow, thoracic sterna bordered with blackish-brown. Fore and mid legs light green. Hind femur with external area in basal half greenish to yellow with a longitudinal blackish band curving apically to the dorsal margin, a small black marking follows; external area around the small black marking, ventral area, and central part or almost all of internal area light red; a preapical ring yellow; hind-knees black. Hind tibia basally black with a blueish spot above, followed by a yellowish ring, rest blackish-brown. Hind tarsi yellowish-brown. One female is lighter coloured, with all the blackish areas chocolate brown.

Measurements (mm): body ♂ 20, ♀ 22–26; antenna ♂ 11, ♀ 7; pronotum ♂ 3.7, ♀ 4.9–5.1; tegmen ♂ 14, ♀ 17–18; hind femur ♂ 11, ♀ 14.

Discussion

The new species comes close to *O. aurora*. The apex of the prosternal process is intermediate between trilobate and distinctly bilobate, as there is a broad interspace between both lateral lobes and a faint indication of a third, median lobe. The name refers to the bilobate cerci in male. The diagnostic characters are given in the key.

Distribution

Only known from the type locality in Central Thailand. The new species has been found at the forest edge.

Oxytauchira aspinosa spec. nov.
(figs 23–24, 28, 35, 41–42, 45)

Holotype: ♂, Northern Thailand, Doi Chiang Dao, 4.–7. VI. 1986, ZSM.
Material studied: The type is unique.

Description

This species is close to *O. bilobata.* The following characters are specific: Frontal ridge flattening below the median ocellus, indistinct above the clypeus. Ratio interocular distance : eye-length about 1:3.7 (0.6:2.4 mm) in male. Apex of prosternal process bilobate with narrow interspace between lobes. Dorsum of pronotum with median carina only indicated in the metazona. Posterior tibia with 9 inner and 8 outer preapical spines; outer apical spine lacking.

Male. Supra anal plate triangular, apex obtuse, with a slight median groove. Cerci almost straight, apex pointing. Epiphallus as in *O. bilobata,* but lophi in posterior view slightly incurved, apex ± truncate. Penis valves and cingulum similar to *O. bilobata,* but with apex of zygoma only slightly bulbous on both sides of the middle. Apices of cingular valves and apical penis valves covered by almost hyaline sheaths forming complex structures as in fig. 41. Basal and apical penis valves connected by a curved, unbroken flexure.

Colouration similar to *O. bilobata,* with the following exeptions: Antennae light orange, tips infumate. Tegmina dark brown with a whitish stripe along cubital veins, apical third almost transparent. Hind wings transparent, very weakly infumated in apical half. Terga and sterna yellowish with dark brown markings less extended than in the preceding species. Hind femur yellow, apical third of external area, apical half of internal area, ventral area, and hind knee orange-red, with 3 faintly brownish markings on the dorsal margin (including the hind knee). Hind tibia basally brown with a greenish yellow spot above, followed by a yellowish ring, rest light brown, spines blackish.

Female unknown.

Measurements (mm): ♂: body 19; antenna 10; pronotum 3.8; tegmen 14.5; hind femur 11.

Discussion

The name of the new species refers to the absence of an external apical spine on the hind tibiae. This is a unique feature in the genus *Oxytauchira.* More material should be studied to be certain if this character prooves to be stable.

Distribution

Only known from the type locality in the mountains of northern Thailand.

Oxytauchira brachyptera Zheng, 1981
(figs 21–22, 27, 34, 40)

Oxytauchira brachyptera Zheng, 1981: 300, 304, figs. 28–38.
Oxytauchira brachyptera Zheng & Liang 1986: fig. 13 (epiphallus).

Holotype (not seen): ♂, China: Yunnan, Mengla, VII. 1974, Gan Yun-Xin, Department of Biology, Shaanxi Normal University.
Material studied: Thailand: 1 ♂, 1 ♀, Chiang Mai, Doi Suthep, 3. VI. 1986.

Diagnosis

See description in Zheng (1981). Epiphallus and apical view of cinculum and apical penis valves as in figs. 21–22, 34, and 40.

Measurements (mm): body ♂ 19, ♀ 22.5; antenna ♂ 9, ♀ 7; pronotum ♂ 3.6, ♀ 4.8; tegmen ♂ 11, ♀ 14; hind femur ♂ 10, ♀ 13.

Discussion

The speciemens at hand agree fairly well with the description in Zheng (1981). In 1986, Zheng & Liang have described another *Oxytauchira* species *(elegans)* from Yunnan that differs from *brachyptera* mainly by smaller size (about 2 mm) and 3–4 mm shorter Tegmina. They state that also the epiphallus should be distinctly different. The difference however is not clear from the figures they give. The values for the length of the tegmen and hind femur of the male from northern Thailand are between both forms, that of the female agree with *O. brachyptera*. If *O. elegans* Zheng & Liang, 1986 is really a distinct taxon, the name must be replaced, since it is a junior homonym of *Oxytauchira elegans* F. Willemse, 1965.

Oxycrobylus gen. nov.

Type species: *Oxycrobylus agilis* spec. nov.

Description

Frontal ridge distinct throughout, only scarcely projecting between antennae; face in profile substraight. Lateral fascial carinae distinct. Vertex and frons in lateral view forming a rounded angle. Pronotum rugose, without median and without lateral carinae, transverse sulci deeply notched. Prosternal process conical, apex subacute. Mesosternal lobes subquadrate, very slightly broader than long. Fully winged; tegmina surpassing hind knees, apex rounded, radial area not modified. Hind femur with dorsal carina serrate; ventral genicular lobes spined. External apical spine of hind tibia absent. Hind tarsus not reaching the middle of hind tibia; second joint much shorter than first. Epiphallus bridge-shaped, almost completely divided, with anchorae and with inner and outer lophi. Penis valves flexured.

Discussion

The new genus is a rather aberrant member of the Oxyinae. It superficially resembles *Parastenocrobylus*, which probably belongs to the Catantopinae s. str. Beside other features, both genera differ by the subfamily characteristics and a completely different phallic complex. The key in Hollis (1975) runs to *Thanmoia* Ramme, 1941. From this genus, *Oxycrobylus* differs mainly by a strongly rougose body, pronotum without median carina and with deeply notched sulci, slender tegmina distinctly surpassing the hind knees, and the epiphallus not completely divided.

Oxycrobylus agilis spec. nov.
(figs 16, 46–55)

Holotypus. ♂, Southeastern Thailand, Khao Soi Dao, forest trail, 15.X. 1985, ZSM.
Material studied: The type is unique.

Description

Body slender, rugose. Antennae filiform, reaching the base of hind femora. Head rugose, in profile reclinate. Frontal ridge projecting very slightly between antennae, sulcate, distinct throughout but margins irregular below median ocellus. Lateral fascial carinae distinct. Eyes somewhat projecting laterally. Interocular distance about one third of the longest diameter of the eye. Fastigium of vertex about hexagonal, slightly grooved, apex rounded, forming with the frontal ridge an obtuse angle. Vertex convex, occiput rugosely punctured.

Pronotum rugose, longer than broad, without median or lateral carinae; anterior margin slightly concave in the middle, posterior margin triangularly rounded; disc convex in prozona, flattened in metazona; first (= submarginal) sulcus also indicated on disc; sulci deeply notched, fourth (= principle) sulcus behind the middle of the sixth tenth of pronotal length. Paranota about as long as high.

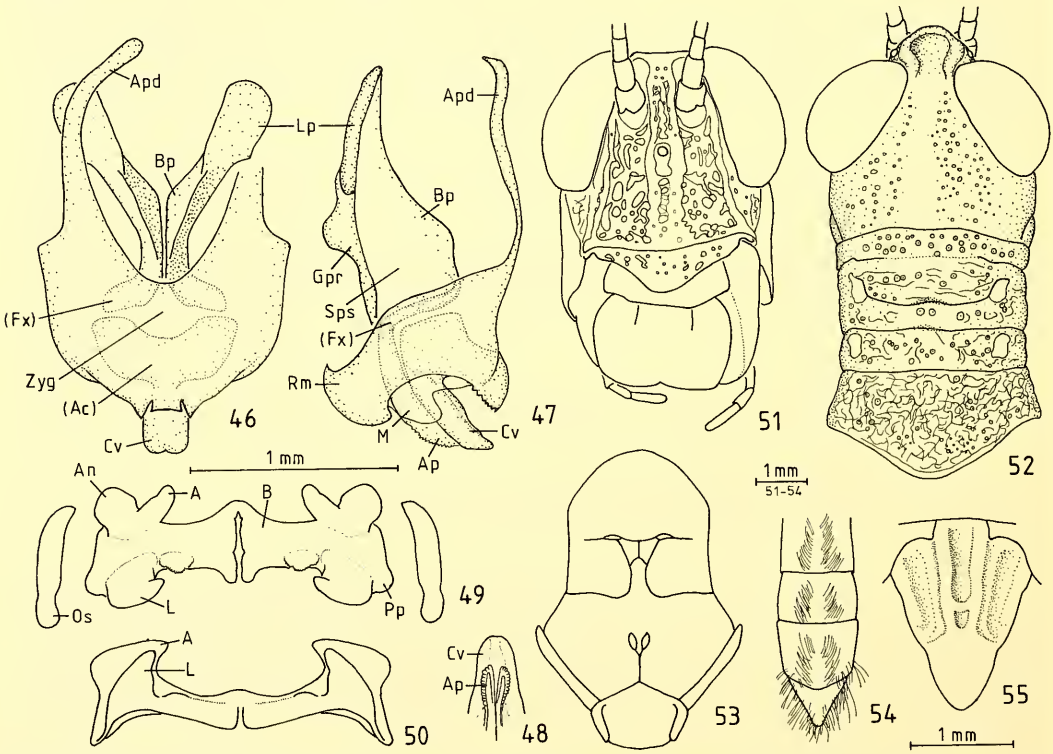
Prosternal process long, conical, apex subacute. Mesosternal lobes very slightly broader than long, mesosternal interspace very narrow; metasternal lobes contiguous. Pleurae rugosely punctured.

Tegmina and hind wings surpassing apex of hind femora. Tegmina slender, with a basal dilation of precostal area, apex narrowly rounded. Hind wings rather narrow. Hind femora moderately thick, especially upper areas rugosely punctured, carinae serrate or subserrate, dorsal carina terminating in a minute tooth; ventral genicular lobes spined. Hind tibiae slightly expanded apically, almost straight, dorsal margins acute in apical half, with 8 external and 9 internal preapical spines, external apical spine absent.

Male. Tenth tergite lateral, with small furculae. Supra anal plate long-triangular, apex rounded; in basal two thirds with a median groove interrupted before its distal end. Cerci somewhat compressed, margins tapering, near the apex almost filiform, apex subacute. Apical abdominal sterna with tufts of dense hair on both sides of the middle. Subgenital plate with a transverse fold, apex conical, obtuse.

Epiphallus bridge-shaped, almost completely divided; with apically rounded anchorae, and with great, extending, about triangular outer and small inner lophi; oval sclerites elongate. Cingulum sclerotised, consisting of flexed apodemes, a broad zygoma, and rami; zygoma projecting apically, covering the arch of cingulum. Cingular valves unpaired. Basal and apical penis valves connected by a strongly curved, unbroken flexure.

Colouration. General colour olivaceous to brownish with dark markings. Antennae brownish. Face olivaceous with black dots, palpi greenish; vertex and occiput with a light brown median band and



Figs 46–55 *Oxycrobylus agilis* gen. nov. + spec. nov. ♂ (holotype). 46. phallic complex in dorsal view; 47. do. in lateral view; 48. apex of the same in ventro-posterior view; 49. epiphallus in dorsal view; 50. do. in posterior view; 51. head in anterior view; 52. head and pronotum in dorsal view; 53. meso- and metasternum; 54. apex of abdomen in ventral view; 55. tenth tergum and supra anal plate.

dark brown lateral bands, the latter widening behind the eyes; occiput with a light brown postocular band. Pronotum with a light brown median band, lateral area of disc and dorsal area of paranota dark brown, all mottled with black dots, ventral area of paranota light brown. Pleurae with episterna brown and epimera blackish. Tegmina olivaceous, anal area whitish. Hind wings light blue, infumate in outer area. Abdominal tergites bluish in the middle, yellowish brown with small bluish strokes laterally. Thoracic sterna light brown, abdominal sterna yellowish brown. Femora and tibiae of all legs olivaceous brown, tarsi olivaceous green; mid and hind femora mottled with bluish black dots; spines of posterior tibiae yellowish with black tips.

Female unknown.

Measurements (mm): ♂: body 24; pronotum 4.6; tegmen 21.5; hind femur 14.

Distribution

Only known from the type locality in southeastern Thailand. The single male has been collected on a forest trail.

Tropidopolinae

Tristria pisciforme Serville, 1839

Material studied: Thailand: 3♂, 3♀, south of Pattaya, 1.–3.IV. 1985; 1♂, 2♀, west of Chiang Mai, 12.IV. 1985; 1♂, Ko Samui, Chaweng, 4.–6.X. 1985; 1♂, Phuket, Rawei, 13.VI. 1986.

Distribution

The known range of this species reaches from southern China to Java. Up to know, only one record was known from Thailand (Hollis 1970).

Apoboleinae

Squamobibracte gen. nov.

Typus generis: *Squamobibracte doipui* spec. nov.

Description

Head distinctly shorter than pronotum. Frontal ridge not prominent between antennae. Pronotum without lateral carinae; median carina low; transverse sulci fine, principal sulcus not significantly deeper than the preceding; hind margin broadly incised in the middle. Squamipter. Prosternal process conical, apex subacute. Mesosternal lobes broader than long. Dorsal carina of hind femur finely serrate. Hind tibia without external apical spine. Second joint of hind tarsus much shorter than first. Epiphallus bridge-shaped. Penis valves flexured. Cingular valves and apical penis valves covered by a common sheath.

Discussion

The key in C. Willemse (1955) runs to *Bibracte* Stål, 1878, the genus diagnosis however disagrees. The most striking differences are the posterior margin of pronotum broadly incised instead of rectangularly or obtusely rounded, the transverse sulci, especially the principal sulcus not deeply cut and without grooves on both sides of the median carina; hind femora rather slender instead of rather thick. An extensive study of the phallic complex in the genus *Bibracte* will probably reveal further significant differences. *Bibracte* belongs to the hitherto ungrouped genera. The peculiar shape of the phallic complex of *Squamobibracte* agrees with the Apoboleinae. The strongly reduced tegmina however lack regular transverse veinlets in the costal area.

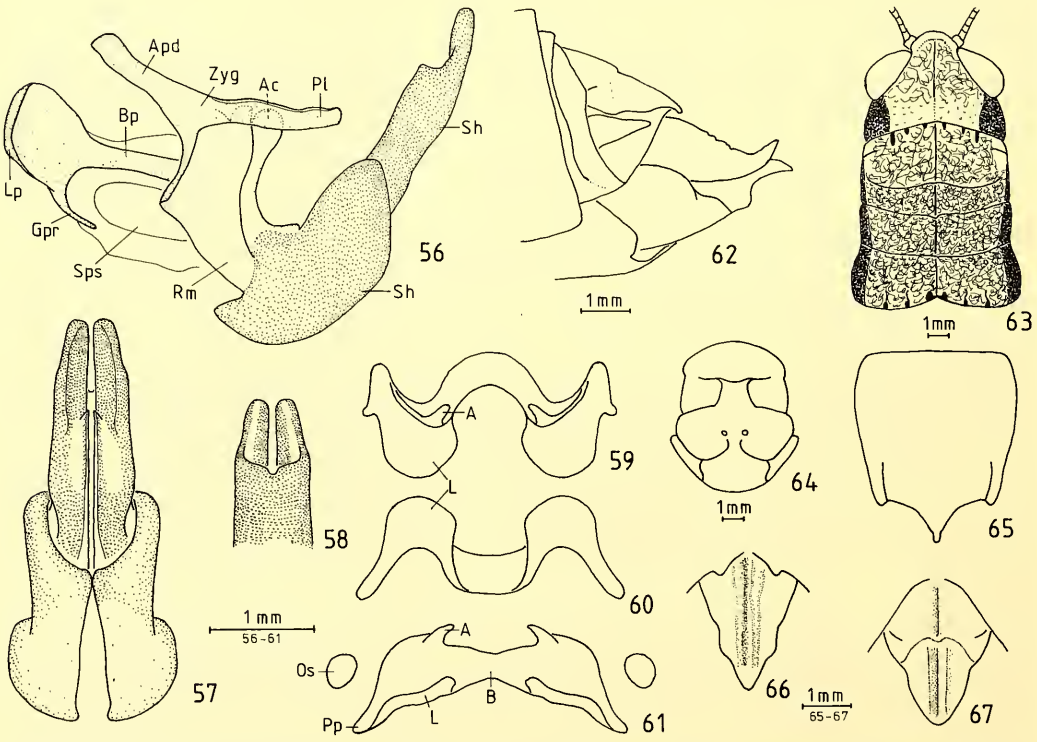
Squamobibracte doipui spec. nov.
(figs 56–70)

Holotype: ♂, Northern Thailand, Chiang Mai, Doi Pui, 24.IX. 1985, ZSM. – Paratypes: 1 ♀ (allotype), same data as holotype, ZSM; 2 ♀, northern Thailand, Phrao-District, mountains north of Phrao, 26.–29.IX. 1985.

Description

Size medium. Antennae strong-filiform, in ♂ reaching hind margin of pronotum, in ♀ somewhat shorter. Head rugosely punctured, mouthparts and genae less so. Face in profile almost vertical; frontal ridge not projecting between antennae, its margins almost parallel to very slightly convex between the antennae and weakly incised just below the median ocellus; distinct to the clypeus, but carinae very low below the median ocellus. Lateral fascial carinae low, very slightly sinuate. Fastigium of vertex sloping, hexagonal, separated by a low arched carinula from the vertex. Vertex and occiput with indication of a median carinula in anterior half. Eyes slightly prominent in ♂, not prominent in ♀. Ratio interocular distance: eye length 1:1.8–2.3 (1.1:2.6 mm in ♂, 1.4–1.7:3.0–3.1 mm in ♀). Infraocular distance distinctly shorter than vertical diameter of eye.

Pronotum longer than broad, disc rugose and with a few callosities along anterior and posterior margins, slightly tectiform, with distinct but low median carina, slightly cut by the transverse sulci; anterior margin very slightly obtuse-angulate, hind margin broad-triangularly incised; lateral margins



Figs 56–67. *Squamobibracte doipui* gen. nov. + spec. nov. ♂ (holotype) and ♀ (allotype). 56. phallus in lateral view; 57. do. in ventro-posterior view; 58. do. apex in dorso-anterior view; 59. epiphallus in anterior view; 60. do. in posterior view; 61. do. in dorsal view; 62. abdominal apex of ♀ in lateral view; 63. head and pronotum of ♀; 64. meso- and metasternum of ♂; 65. subgenital plate of ♀; 66. supra anal plate of ♂; 67. do. of ♀.

rounded in anterior half, almost angularly sloping in posterior half, but not keeled; first (= submarginal) sulcus distinct on paranota and sides of disc, second sulcus only on disc, third and fourth distinct on both or less distinct on paranota; principle (= 4th) sulcus at the end of the eigth tenth of the length of the median carina, only negleciably deeper than the preceding sulci. Paranota longer than high, shining in the middle of dorsal half, other parts coarsely punctured. Prosternal process short, conical, base broad, apex subacute. Mesosternal lobes broader than long; mesosternal interspace widening posteriorly, about as long as broad in ♂, broader than long in ♀, Metasternal lobes separated in ♂, broadly separated in ♀.

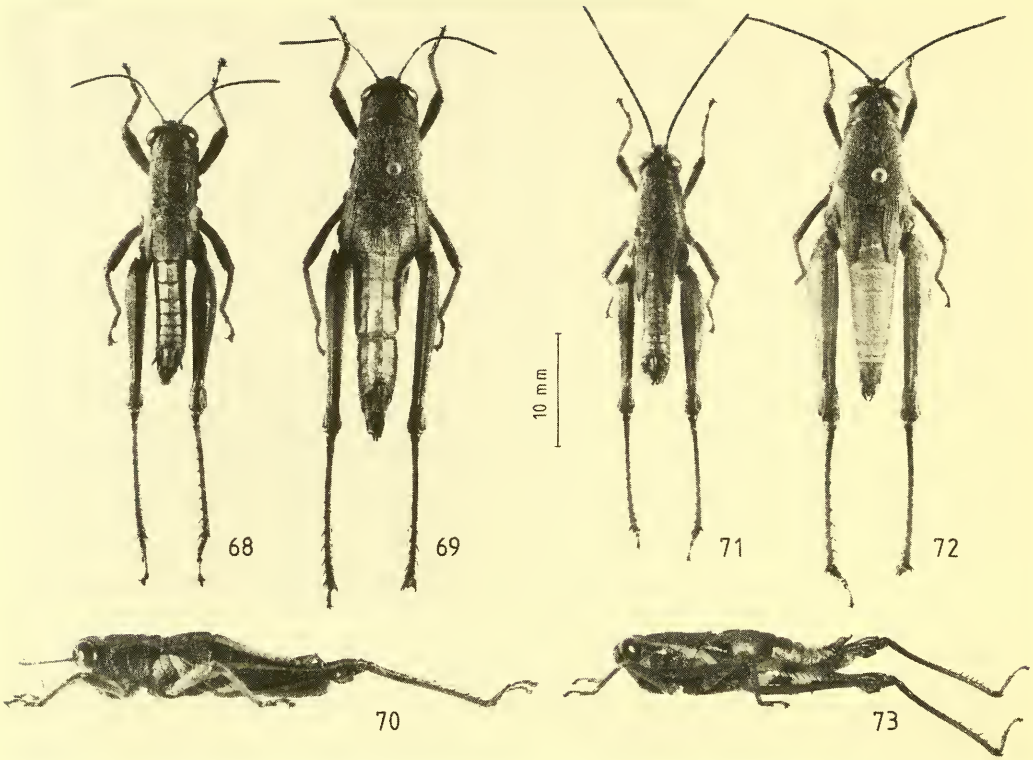
Squamipter, tegmen coreaceus, scale-like, with almost parallel margins, reaching to apex of first abdominal tergum and covering tympanum. Hind wings vestigal. Mesonotum apically uncovered, with a preapical transverse-triangular fold. Metanotum and abdominal terga slightly tectiform with a median carina, most expressed in first tergum and gradually lowering towards end of abdomen; metanotum and first tergum rugosely punctured, the following terga rather subsmooth, sterna smooth. Hind femur rather slender, reaching about to top of abdomen; dorso-median carina sparsely and finely serrate, other carinae subsmooth; dorsal areas rugose, other areas subsmooth; ventral genicular lobes rounded. Hind tibiae with 8 internal and 6–7 external preapical spines and 1 internal apical spine, external apical spine absent. Hind tarsi short, not reaching the middle of hind tibiae; second joint much shorter than first.

Male. Tenth tergum lateral, with small, rounded furculae. Supra anal plate elongate-triangular, with a median furrow, margins slightly incised about in the middle of length and preapically, apex obtuse-triangular. Cerci compressed, triangular, basally high, margins tapering towards the pointed apex. Subgenital plate completely separated from ninth abdominal sternum, in lateral view slightly higher than long (in the middle of height), ventro-apically rounded, dorsal margin very slightly sloping backwards, substraight. In situ the apex of the phallic complex, covered by membrane, is projecting over the dorsal margin of the subgenital plate.

Epiphallus bridge shaped, undivided, in anterior view sinuate; anchorae small, slightly curved, apex obtuse; lophi extending in an ± 90°-angle, large, apex rounded; oval sclerites small. Apodemes slightly curved. Zygoma with a shelf-like supra-zygomal plate above and caudad, covering arch of cingulum, margins of the plate slightly narrowing apically, apex subtruncate. Rami connected with ectophallic sheaths. Ectophallic sheaths large, membranous, surface granular, connected dorso-apically with sheaths covering the penis apex. Basal and apical penis valves connected by a strongly curved, unbroken flexure. Cingular valves and apical penis valves remarkably extended dorso-apically, both covered by a common membranous sheath with granular surface and terminating in two ventro-apical lobes.

Female. Supra anal plate elongate, lateral margins tapering backwards, apex obtuse; disc with a median furrow, lateral areas strongly sloping, with a submarginal fold at the base; step-like inclining behind the middle. Cerci short, conical, apex obtuse. Subgenital plate with lateral margins slightly convex, hind margin concave on both sides between a median triangular projection and slightly protruding latero-apical corners, a short fold in front of the concavities. Ovipositor with outer margins indistinctly serrate to subsmooth, apices of dorsal and ventral valves hooked, ventral valves with a large laterobasal sclerite.

Colouration. General colour dark to reddish dark brown with black and with whitish to medium brown markings. Antennae yellowish to reddish brown, darker at the apex. Face and mouthparts yellowish brown (♂) or dark brown (♀), antennal grooves above antennae black; vertex and occiput medium to dark brown, indistinctly mottled with dark; an area of genae and occiput reaching from behind the middle of the vertical diameter to below the middle of the horizontal diameter of the eye black. Pronotum medium to dark brown with indistinct darker markings, paranota with a shining black area starting and small at the submarginal sulcus, widening to and broad at the hind margin. Pleurae ivory-white in male, dark brown in female. Metanotum and abdominal terga with a broad light (whitish brown in ♂, medium brown in ♀) median band, bordered by a lateral shining black



Figs 68–70. *Squamobibracte doipui* gen. nov. + spec. nov.: 68. ♂ (holotype); 69. ♀ (allotype); 70. ♂ (holotype) in lateral view.
Figs 71–73. *Striatosedulia pluvisilvatica* gen. nov. + spec. nov.: 71. ♂ (holotype); 72. ♀ (allotype); 73. ♂ (holotype) in lateral view. Figs. 68, 70, and 71 taken before, fig. 73 after removal of the phallic complex.

band narrowing posteriorly and ending on 7th or 8th tergum; in ♂ the light band is filled with dark in the middle of metanotum and first tergum, in ♀ both are completely dark; first and partly second terga with dark spots at the hind margin; lateral margin of terga and abdominal apex light to dark brown, mottled with dark. Base of prosternal process and surrounding area black, tip yellowish. Thoracic sterna yellowish brown mottled with black and brown, especially along the margins. Abdominal sterna yellowish brown with an interrupted, dark brown, median line. Anterior and median legs yellowish to brown, mottled with dark. Hind femur with external area blackish to brown mottled with lighter areas, at the base one or two short longitudinal light stripes; internal area blackish, mottled with lighter areas; ventro-internal area red; hind knees concolourous. Hind tibia with basal half spotted brownish, apical half and hind tarsus red.

Measurements (mm): body ♂ 26, ♀ 31; antenna ♂ 11, ♀11; pronotum ♂ 5.5; ♀ 7.0; tegmen ♂ 4.3, ♀ 5.0–5.4; hind femur ♂ 13, ♀ 16.

Distribution

Mountains of northern Thailand. The species has been found on forest clearings in about NN + 800–1 200 m.

Calliptaminae

Acorypha insignis (Walker, 1870)

Material studied: Thailand: 1 ♂, 1 ♀, west of Chiang Mai, 12.IV. 1985.

Measurements (mm): body ♂ 20, ♀ 28; pronotum ♂ 4, ♀ 5.5; tegmen ♂ 17, ♀ 23; hind femur ♂ 12, ♀ 16.

Distribution

The record is of great zoogeographical interest as it is the first record of a member of the subfamily Calliptaminae from the eastern oriental region. The range of the species was known to cover the dry north west of India and the Arabian peninsula. The material at hand agrees fairly well with the description given by Jago (1966). The apices of the penis valves, however, are a little shorter than in fig. 122 in Jago (1966). Moreover, the specimens at hand are smaller than the measurements given in Uvarov (1950). More material is needed to decide wether the population from Thailand belongs to a distinct subspecies or not.

Catantopinae (s. str.) and unassigned genera

Striatosedulia gen. nov.

Typus generis: *Striatosedulia pluvisilvatica* spec. nov.

Description

Face with frontal ridge prominent between the antennae. Pronotum slightly tectiform, median carina low, lateral carinae absent. Squamipter. Tegmina with a shining black spot in basal half of anterior (= ventral) area, apical half of anterior area in male with numerous parallel veinlets, in female only indicated near margin. Prosternal process conical, apex pointed. Mesosternal lobes slightly broader than long or almost as long as broad. Hind tibia without outer apical spine. Second joint of hind tarsus much shorter than first; hind tarsus distinctly shorter than half the length of the tibia. Epiphallus bridge-shaped, with anchorae.

Discussion

In general appearance, the new genus is close to *Sedulia* Stål, 1878, but more robust. The key in C. Willemse (1955) also runs to *Sedulia*. The most striking difference is the posession of parallel veinlets on the tegmina of the male. It is possible that they are part of a stridulatory mechanism. However no stridulation was observed. Further differences to *Sedulia* are very long antennae, a pointed prosternal process, an apically bilobate subgenital plate in male, and the shape of the epiphallus with distinct anchorae and large extending lophi. For comparison the epiphallus of *Sedulia specularia* Stål, 1875, is figured in Dirsh (1956). Morphology and the phallic complex agree best with the subfamily Catantopinae. However, this subfamily still contains a heterogenous assemblage of unrelated groups of genera.

Striatosedulia pluvisilvatica spec. nov.
(figs 71–87)

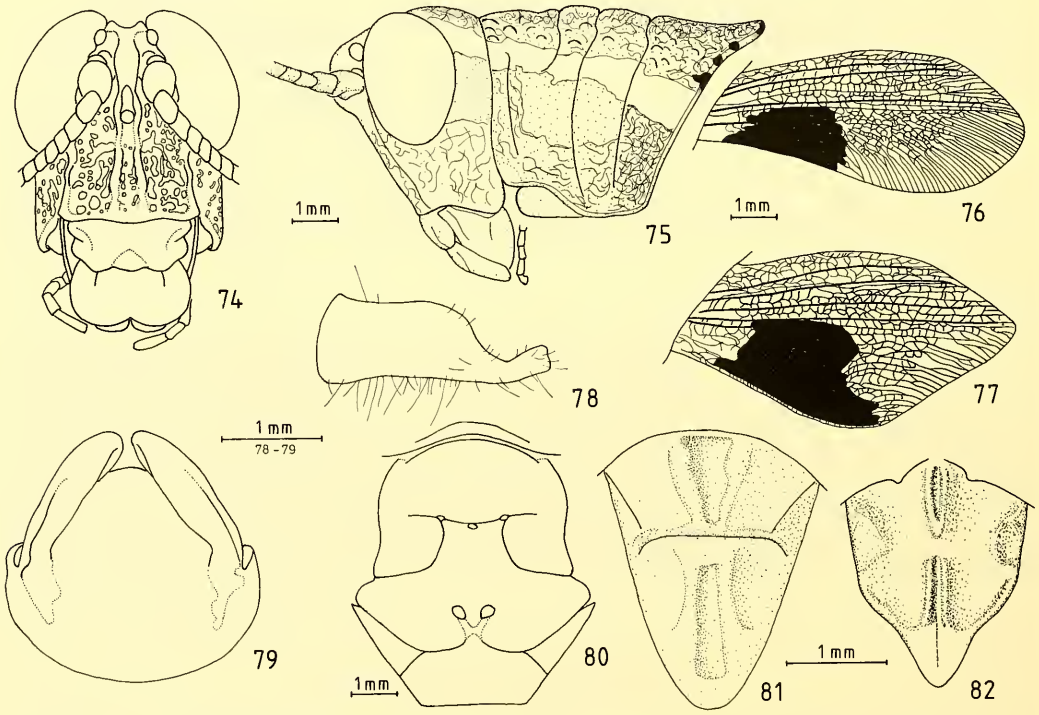
Holotype: ♂, southeastern Thailand, south of Klaeng, Wan Keo, forest floor, 13.X. 1985, ZSM. – Paratypes: 3 ♂, 3 ♀, same data as holotype, allotype in ZSM; 1 ♀, mountains northwest of Chanthaburi, 14.X. 1985, 1 ♂, Khao Soi Dao, 15.X. 1985.

Description

Body rugose, of median size; female robust. Antennae longer than head and pronotum together, in male reaching about to top of tegmina, joints slightly compressed but not widened. Face in profile reclinate, frontal ridge projecting somewhat between antennae, distinct to clypeal margin, shallowly sulcated, carinae weak below median ocellus, almost parallel to slightly diverging. Lateral fascial carinae subconvex, especially in male. Fastigium of vertex about triangular anteriorly, with top subacute in male, rounded in female; suddenly narrowing behind the lateral ocelli; lateral margins bordered by low carinulae that reach to about middle of the compound eyes. Ratio smallest inter-ocular distance : eye length 1 : 6–7 (0.4 : 2.5–2.8 mm) in male, 1 : 4–5.3 (0.6–0.8 : 3.1–3.2 mm) in female. Eyes oval, vertical, infraocular distance distinctly shorter than eye. Vertex and occiput with a weak median carinula.

Pronotum rugose, longer than broad, widened posteriorly, anterior margin slightly convex, posterior margin of disc very slightly concave on both sides, projecting in the middle, projection with apex rounded to subtruncate; anterior and posterior margins with small black callosities; median carina distinct but low, cut by 3 sulci, lateral carinae absent; discus slightly tectiform except for the last 2/3 of the metazona. Prosternal process conical, apex pointed. Mesosternal lobes slightly broader than long or almost as long as broad; mesosternal interspace widening posteriorly; metasternal lobes separated.

Squamipter, tegmen reaching almost apex of third (♂) or apex of second tergum (♀), greatest width behind (♂) or about in the middle (♀), apex rounded in male, obtuse-angular in female; venation more or less coreaceous, basal half with a great, black, shining mark touching the ventral margin; ventral



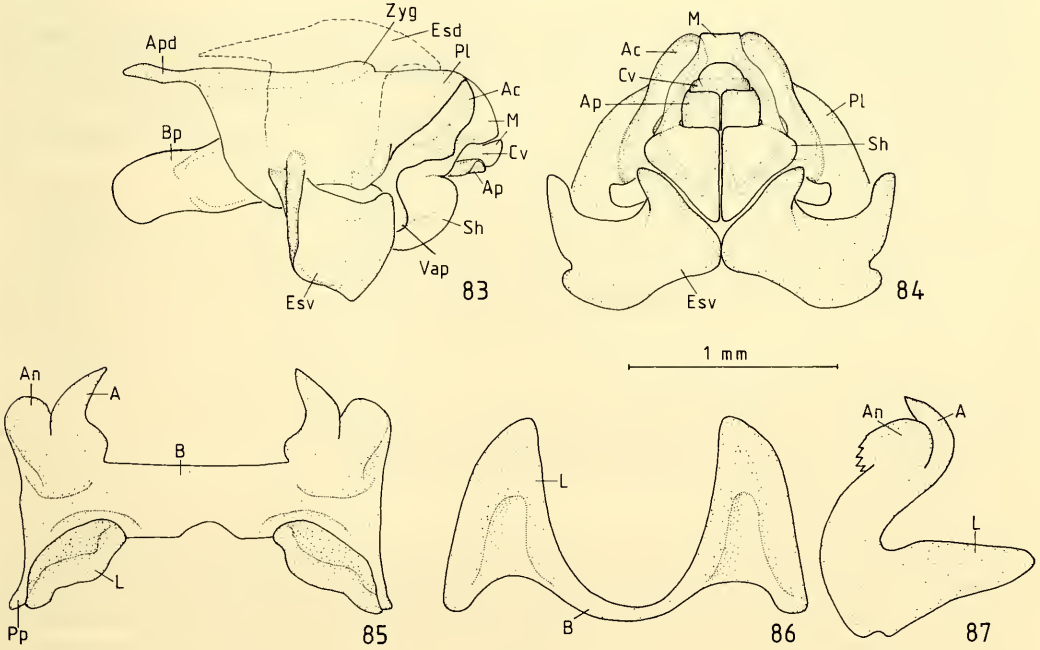
Figs 74–82. *Striatosedulia pluvisilvatica* gen. nov. + spec. nov. 74. head of ♂ in anterior view (holotype); 75. head and pronotum of ♂ in lateral view (paratype); 76. left tegmen of ♂ (holotype); 77. left tegmen of ♀ (allotype); 78. left cercus of ♂ in external view (holotype); 79. subgenital plate of ♂ in ventro-posterior view (paratype); 80. meso- and matasternum of ♂ (holotype); 81. supra anal plate of ♀; 82. do. of ♂ (holotype).

area in apical half with numerous parallel veinlets in male; in female only indicated near ventral margin. Hind wings vestigal.

Hind femur moderately stout, thick; dorso-external and both ventral areas rugose; dorso-internal area with long bristles pointing mediad, especially in basal half; dorso-median carina slightly serrate, terminating in a small tooth; dorso-lateral carina somewhat rugose, other carinae subsmooth; ventral genicular lobes obtuse. Hind tibia slightly curved and very slightly widening posteriorly; dorsal margins rounded, ventral margins acute in apical half; 8 internal and 7–8 external preapical spines and 1 internal apical spine; external apical spine absent. Hind tarsus short, not reaching the middle of hind tibia, second joint much shorter than first one.

Male. Ninth and tenth terga fused, lateral, with indication of furculae only. Supra anal plate with an interrupted median furrow, lateral margins slightly narrowing from base, apically rounded but with a median obtuse-triangular projection, a small fold in the basal corners. Cerci compressed and very slightly incurved, at the beginning of the apical third suddenly narrowed, apex truncate. Subgenital plate short, conical, without transverse fold, terminating in two obtuse lateral lobes.

Epiphallus bridge-shaped, with long, hook-shaped, apointed anchorae; lophi extending in an almost 90°-angle, seen from behind obtuse-triangular, margins thickened. Oval sclerits present but weakly sclerotised. Ectophallic membrane thickened to form a dorsal and paired ventral ectophallic sclerites; dorsal ectophallic sclerite bridge-shaped with paired cranial appendages, covering the cingulum dorsally and laterally; ventral appendages articulated with the rami, curved, medio-apically with a horn-shaped process, covering the ectophallic sheates ventrally, Cingulum with apodemes short, rami rather low and long, zygoma prolonged into a convex plate connected with arch of cingulum; arch of cingulum with a ventro-apical projection, covered apically by a membranous structure connected with ectophallic sheath. Basal and apical penis valves connected by a curved, unbroken flexure.



Figs 83–87: *Striatosedulia pluvisilvatica* gen. nov. + spec. nov. ♂ (holotype). 83. phallus in lateral view; 84. do. in ventro-posterior view, dorsal ectophallic sclerite indicated by broken line; 85. epiphallus (oval sclerites not drawn) in dorsal view; 86. do. in posterior view; 87. do. in lateral view.

Female. Supra anal plate long-triangular, medially grooved and divided by a transverse step-like inclination before the middle of length, apex rounded. Cerci conical, subacute, not reaching apex of supra anal plate. Subgenital plate somewhat longer than broad, lateral margins in ventral view almost parallel, apex concave on both sides of a median, triangular, subacute projection. Ovipositor short, dorsal valves ± straight, subapically step-like narrowed and very slightly upcurved, apex rounded; ventral valves basally broad, step-like narrowed before the middle, apical part downcurved, apex subacute.

Colouration. General colour diverse shades of dark brown with light, brownish-white markings in male; females mostly darker, the light markings medium brown; all light areas can be mottled with dark spots and reverse. Antennae medium to dark brown, with a subapical white ring. Face in male light mottled with dark, in female the same or reverse. Vertex, occiput and disc of pronotum medium to dark brown, a light band runs from behind eyes along dorsal margin of paranotum and on pleurum to base of hind femur; occiput with a dark band ventro-laterally of the light band; rest of paranota dark brown. Tegmina of male in ventral half behind the shining black mark brownish-white, ventral margin, apex, and dorsal half dark brown. Abdominal terga of male dark brown medially (less so on terga 6–8) and along the lateral margins, light in between, the light areas usually enlarged dorso-medially on terga 6–8. Tegmina and terga of female unicoloured medium to dark brown. Prosternum and anterior margin of mesosternum brown or brown mottled with light; meso-, meta- and abdominal sterna red, apical sterna sometimes reddish-brown. Anterior and median legs brown, median legs with black spots below. Hind femur with external area brownish-white to medium brown with 3 blackish-brown transverse bands, a subapical light-coloured ring is mostly infumate and rarely distinct, dorsal genicular lobes usually dark (in light individuals less so), ventral lobes lighter (in dark individuals infumate); internal area basally red, 2 transverse blackish-brown bands with interspace light brown, a light preapical ring and hind knee as before; ventro-internal area red, apically dark, ventro-external area basally reddish, more or less completely infumated. Hind tibia with basal half brown, apical half and hind tarsus red.

Measurements (mm): body ♂ 20–25, ♀ 28–30; antenna ♂ 13–15, ♀ 10–13; pronotum ♂ 5.1–6.1, ♀ 7.6–8.5; tegmen ♂ 6.1–6.8, ♀ 5.9–6.8; hind femur ♂ 12–13, ♀ 16–18.

Distribution

Forest areas in southeastern Thailand. This species is one of the few acridids that live in shaded areas on the forest floor. It was found on litter and on lower plants.

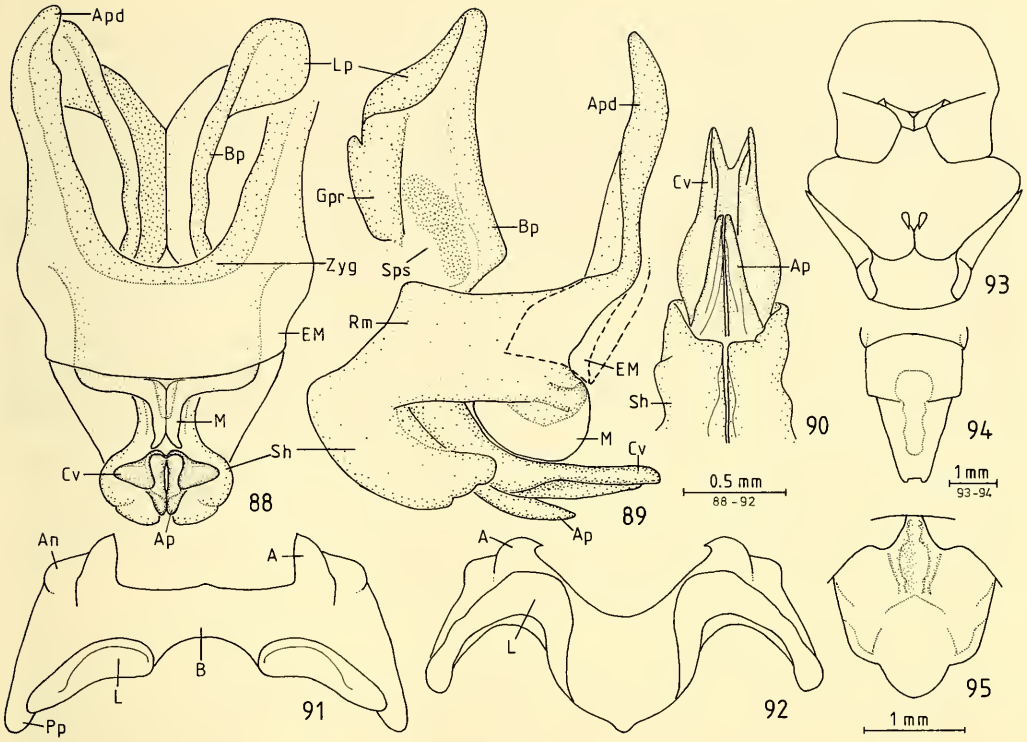
Parastenocrobylus borneensis C. Willemse, 1922
(figs 88–95)

Parastenocrobylus borneensis C. Willemse, 1922: 8, Taf. I, fig. 3.
Parastenocrobylus borneensis C. Willemse 1957: 482 (see this paper for synonymy and description).

Holotype (not seen): ♀, Borneo, Bandjar, Coll. R. Ebner, Museum Wien.
Material studied: 1 ♂, M. Java, Kedoengdjati, 50 m, 24.I.1923, L. G. E. Karlshoven, det. C. Willemse, NMM.

Description of phallic complex

Epiphallus bridge-shaped; with hooked anchorae and large, extending, apically rounded lophi. Ectophallic membrane folded above and covering zygoma. Apodemes rather robust. Zygoma and arch of cingulum connected with a hyaline, rounded, apical projection. Rami connected with membranous ectophallic sheaths, covering the base of the apical penis valves ventrally. Cingular valves unpaired, lateral margins bent ventrally, covering the apical penis valves dorso-laterally, apex bilobate. Apical penis valves distinctly shorter than cingular valves, apex subacute. Apical and basal penis valves connected by a curved, unbroken flexure.



Figs 88–95. *Parastenocrobylus borneensis* C. Willemse ♂ (Kedoengdjati, Java). 88. Phallus in dorsal view; 89. do. in lateral view; 90. do. apex in ventro-posterior view; 91. epiphallus (oval sclerites not drawn) in dorsal view; 92. do. in posterior view; 93. meso- and metasternum; 94. subgenital plate in ventral view; 95. supra anal plate.

Discussion

The species was studied for comparison with *Oxycrobylus* gen. nov. I use the oppotunity to describe the hitherto undescribed phallic complex. The genus might provisionally be placed in the Catantopinae s. str., but classed with another subfamily when the Catantopinae are further split.

Distribution

Borneo, Malay Peninula, Sumatra, Java.

Bettotania C. Willemse, 1933

Bettotania C. Willemse, 1933: 75.
Paracelebesia Miller, 1935: 697.
Bettotania C. Willemse 1955: 112 (see this paper for description).

Type species: *Bettotania maculata*, C. Willemse, 1933, by original designation.

Discussion

The genus contains forest dwelling species which are rarely found in collections. With the exeption of *B. maculata* all species have been described from single females. The main diagnostic features are colouration and colour pattern, which might probably play a role in species recognation. Great pro-

truding eyes are a hint that the species are optically oriented. My collections from Thailand contain a male that represents a new species. For the first time the phallic complex is studied within this genus.

The systematic position of *Bettotania* is uncertain as it shows characters of Euthyminae, Oxyinae and Coptacrinae. Most characters it shares with the Oxyinae, as tufts of hair on the three apical sternits, expanded hind tibiae, and a divided epiphallus. Moreover in the oxyine genus *Stolzia* the epiphallus is asymmetrical as in *Bettotania*. In *Bettotania* however the ventral genicular lobes of the hind femora are not spined, a very characteristic feature of the Oxyinae. The male of *B. asymmetrica* spec. nov. has the penis valves divided, a character of Euthyminae. In the male of *B. maculata* C. Willemse they are however connected by a sinuate flexure, a rather unique feature. The male of *B. asymmetrica* spec. nov. – but not of *B. maculata* C. Willemse – posses regular transverse veinlets on the tegmina very similar to those found in Euthyminae, they are however in the medial, not in the radial area. The general appearance of *Bettotania* is that of Coptacrinae. Common characteristics are the vertex almost forming an angle with the occiput, compressed cerci, tenth tergum with furculae, and epiphallus divided. It differes in having hind tibiae with an external apical spine, penis valves divided or unusually flexured, and specialised tegmina in the male of at least one of the species.

Apart from *B. maculata* C. Willemse and the new species, both described below, I have examined the ♀ holotype of *B. flavostriata* F. Willemse, 1963, and a ♀ of *B. cinctifemur* (Miller, 1935).

Key to the species of *Bettotania*

1. Disc of pronotum unicolourous 2
– Disc of pronotum with yellow spots or longitudinal stripes 3
2. Hind femora green, hind knees ochreous, without orange pregenicular ring. Hind tibiae green. Hind wings hyaline, faintly green along costal area, outer area infumate. Selangor ..... *festiva* (Miller, 1935)
– Hind femora olivaceous with an orange pregenicular ring; hind knees black. Hind tibiae black with a subbasal yellowish ring. Hind wings blue, outer area infumate. Southeastern Thailand *asymmetrica* spec. nov.
3. Disc of pronotum with four yellow spots. Hind femora olivaceous green with a pregenicular yellow spot from above. North Borneo ..... *maculata* C. Willemse, 1933
– Disc of pronotum with two yellow longitudinal stripes. Hind femora with a complete or incomplete pregenicular yellow ring 4
4. The two yellow longitudinal stripes on the disc of pronotum not continuing on tegmina. Metasternal episternum with an ovate yellow spot. Hind femora olivaceous green, hind knees reddish brown. North Borneo ..... *cinctifemur* (Miller, 1935)
– The two yellow longitudinal stripes on the disc of pronotum continuing on tegmina. Metasternal episternum with an ovate bright red spot. Hind femora reddish brown. East Borneo ..... *flavostriata* F. Willemse, 1963

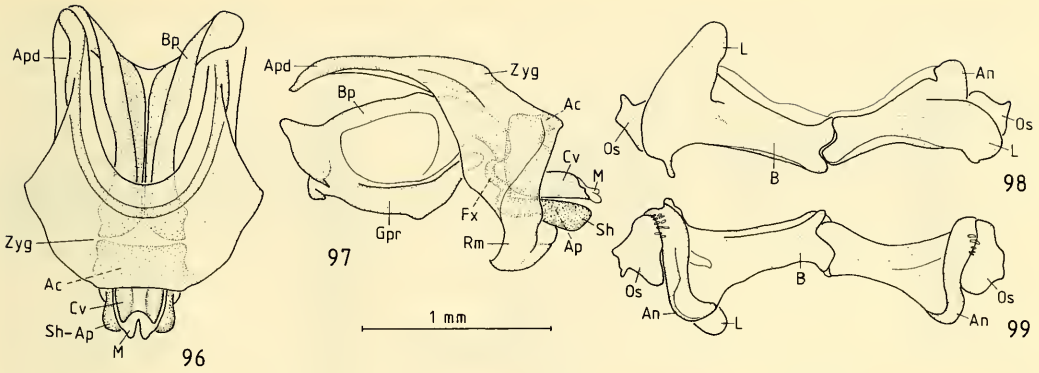
Bettotania maculata C. Willemse, 1933
(figs 96–99)

Bettotania maculata C. Willemse, 1933: 75, fig. 4.
Bettotania maculata C. Willemse 1955: 114, fig. 81.

Holotype: ♂, North Borneo, Bettotan, near Sandakan, 26. VII. 1927, NMM.
Additional material studied: Paratype: 1 ♀, same locality as holotype, 30. VIII. 1927, NMM.

Description

For general morphology, colouration, and measurements see description in C. Willemse (1955).



Figs 96–99. *Bettotania maculata* C. Willemse ♂ (holotype): 96. phallus in dorsal view; 97. do. in lateral view; 98. epiphallus in dorsal view; 99. do. in ventral view.

Male. Tenth tergum continous; furculae basally broad, suddenly narrowed, and apically pointed. Supra anal plate long-oval, with a median basal impression, lateral margins with a pointed tooth somewhat behind the middle, apex rounded. Cerci compressed, conical, apex pointed. Apical abdominal sternites with tufts of hair on both sides of the middle. Subgenital plate with a transverse fold, apical part conical, obtuse.

Epiphallus divided and asymmetrical; left lophus long, finger-shaped, right lophus small, rounded; anchorae absent; oval sclerites attached to epiphallus. Phallus rather short. Apodemes broad, with sclerotised and hyaline areas; ventral side of zygoma connected with arch of cingulum; rami almost hyaline, stronger sclerotised along the hind margin. Cingular valves united; a weak membranous structure attached at apex. (It is not impossible that the membrane was originally larger, forming a sheath, which was damaged later. The phallic complex was mounted on cardboard several years ago). Apical penis valves covered by a sheath. Basal and apical penis valves connected by a sinuate, unbroken flexure.

Bettotania asymmetrica spec. nov.
(figs 100–107)

Holotype. ♂, Southeastern Thailand: Khao Soi Dao, 15.X.1985, ZSM.
Material studied: The type is unique.

Description

Head rugose. Antennae filiform, longer than head and pronotum together, subapical segments slightly flattened, apical segment pointed. Frontal ridge in lateral view projecting between antennae, ± obsolete below, dorsal half of the projecting part with surface smooth, ventral half slightly sulcate. Lateral fascial carinae indistinct. Eyes prominent. Interocular distance a little less than one fifth of the vertical diameter of the eye. Vertex convex with a fine median carinula. Fastigium of vertex narrow, projecting in front of the eyes, somewhat widening anteriorly, not separated from the frontal ridge.

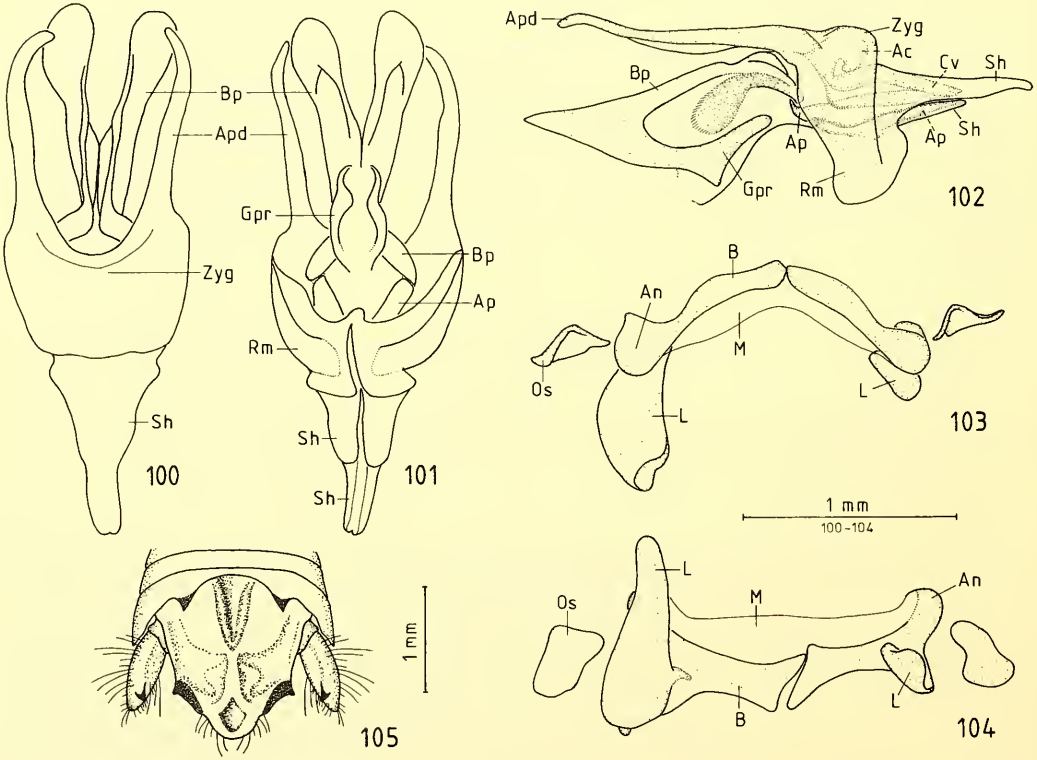
Pronotum slightly widening posteriorly, surface rugosely punctate. Anterior margin of disc rounded with an indistinct median incision, posterior margin triangular with apex rounded; lateral carinae absent, median carina indistinct throughout. Principle sulcus in the middle of the sixth tenth of pronotal length; all sulci indistinct in the midline of the disc. Paranota slightly longer than high. Prosternal process short, conical, apex pointed. Mesosternal interspace broader than long; mesosternal lobes

subquadrate, inner margins substraight. Metasternal lobes separated, inner margins rotundate angulate. Pleurae rugosely punctate.

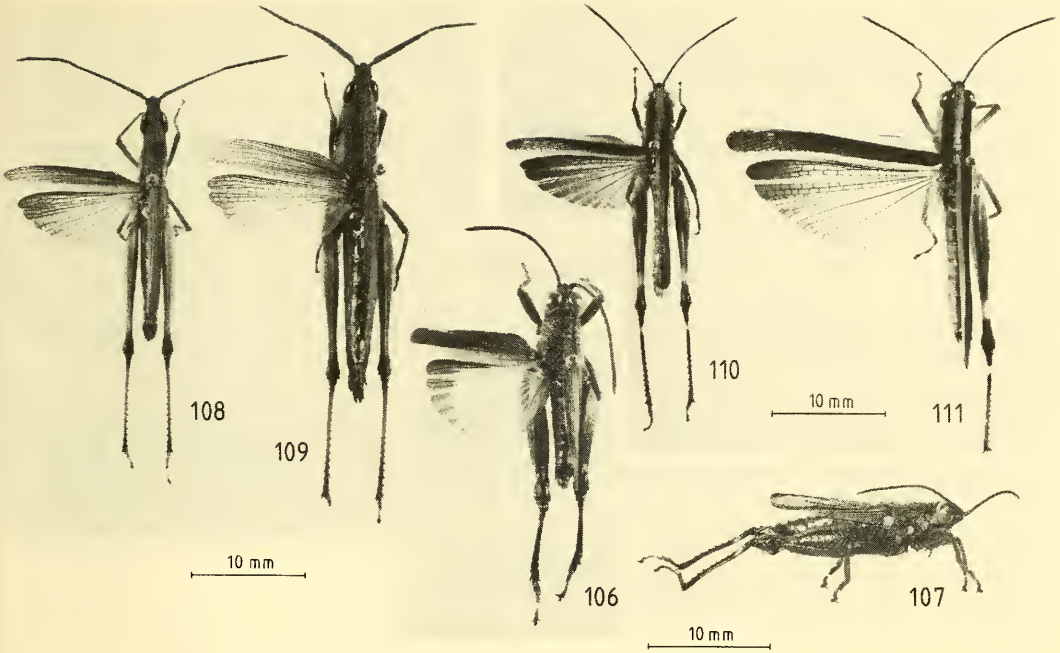
Tegmina and hind wings reaching top of hind knees. Tegmina with costal lobe well developed, narrowed apically, apex rounded; medial area widening apically, with 11–12 regular transverse veinlets; cubitus 2 with a row of long and thin extending bristles in somewhat more than basal half. Wings subcycloid. Legs short and thick, hairy and with sparse long and thin bristles. Hind femur short and stout, extending very little beyond top of abdomen, carinae serrate; ventral genicular lobes triangular, apex obtuse to subacute. Hind tibia slightly curved and widening towards apex, dorsal margins acute, ventral margins rounded, with 6–7 external and 8 internal preapical spines, external and internal apical spines present. Hind tarsus about half as long as tibia, third joint about as long as first and second together.

Male. Tenth tergite continous, with pointed furculae. Supra anal plate with a median groove in basal half, midline elevated thereafter, but apically grooved again; lateral margins slightly narrowing from the base, at the beginning of apical third protruding and pointing, apex rounded. Cerci compressed, short, conical, internal area with a small subapical tooth. The three apical sternits with tufts of long hair on both sides of the middle. Subgenital plate elongate, with a transverse fold, apex obtuse.

Epiphallus divided, asymmetrical, without anchorae, left lophus large, extending, flexed, pointing craniad, right lophus small; oval sclerites flexed, irregularly shaped. Cingulum consisting of apodemes, zygoma, and rami. Rami ventrally continued into ectophallic sheaths. Cingular valves and apical



Figs 100–105. *Bettotania asymmetrica* spec. nov. ♂ (holotype). 100. phallus in dorsal view; 101. do. in ventral view; 102. do. in lateral view; 103. epiphallus in anterior view; 104. do. in dorsal view; 105. apex of abdomen in dorsal view.



Figs 106–111. 106–107. *Bettotania asymmetrica* spec. nov. ♂ (holotype); 108–109. *Chlorophlaeoba tonkinensis siamensis* subspec. nov. 108. ♂ (paratype); 109. ♀ (allotype); 110–111. *Ceracris fasciata* Brunner ♂♂, showing variation in size (110. Pattaya; 111. Mae Hong Son e. l.).

penis valves completely covered by sheaths; dorsal sheath extenting far beyond tip of cingular valves. Basal and apical penis valves divided but almost touching each other and connected by membrane.

Colouration. General colour dark olivaceous brown with yellow and black markings. Antennae blackish brown, basal segments, tips, and underside lighter. Eyes brown. Head olivaceous, fastigium and vertex bordered by thin yellow lines; occiput with dark brown postocular bands bordered laterally by a yellow postocular spot; face with irregular black dots, the most striking are at both ends and in the middle of the clypeal suture; palpi yellowish. Disc of pronotum olivaceous, paranota dark brown with 2 large yellow spots at the ventral anterior and posterior corners. Tegmina olivaceous brown, anal area creamish. Hind wings light blue, outer area infumate. Pleurae olivaceous with 2 yellow spots over the base of hind femur and in the upper area of metasternal episternum. Metanotum and first abdominal tergum blackish brown, tympanum white; 2nd to 7th terga yellowish brown with a dark brown spot on both sides of the middle, contiguous on 2nd and decreasing in size towards 7th tergum; 2nd and 3rd terga dark brown at lateral margins; furculae black; supra anal plate yellowish brown with a black stripe at latero-posterior margins. Prosternal process yellowish. Sterna and subgenital plate yellowish mottled with brown and with black markings. Fore and mid legs olivaceous green. Hind femora olivaceous green with a dirty-orange pregenicular ring; interior area with an irregular longitudinal black band extended to ventral area in front of the pregenicular ring; hind knees black exept for the midline of dorsal area and for the apex of the lower genicular lobes. Hind tibiae black with a light spot on top of base and with a yellowish ochreous subbasal ring; spines yellow with black tips. Tarsi of all legs yellowish brown with tips of claws and areolae black.

Female unknown.

Measurements (mm): ♂: body 17; antenna 12; pronotum 4.9; tegmen 11; hind femur 9.

Discussion

The new species comes close to *B. festiva* (Miller, 1935), which is only known from a single female. The main diagnostic characters are figured out in the key.

Distribution

Only known from the type locality in southeastern Thailand. The male has been found on a forest trail.

Genimen burmanum Ramme, 1941

Material studied: Thailand: 1♂, 2♀, Phrao-District, 26.–29.IX.1985; 1♂, 2♀, Doi Chiang Dao 4.–7.VI.1986.

Distribution

The species, described from Burma (Ramme 1941), has recently been recorded from China (Zheng 1980). It also occurs in the mountains of northern Thailand.

Phlaeobinae

Chlorophlaeoba Ramme, 1941

Clorophlaeoba Ramme, 1941: 15.

Type species: *Chlorophlaeoba tonkinensis* Ramme, 1941, by original designation.

The genus is very close to *Phlaeoba*, differing in the head being as long as or longer than the pronotum. Two species have been described within the genus, but one of them is now regarded as a synonym.

Chlorophlaeoba tonkinensis tonkinensis Ramme, 1941, stat. nov.
(figs 112–114)

Chlorophlaeoba tonkinensis Ramme, 1941: 15, Taf. II, fig. 1.
Chlorophlaeoba tonkinensis C. Willemse 1951: 86.
Chlorophlaeoba longusala Zheng, 1982: 83, 86, fig. 1–7, syn. nov.

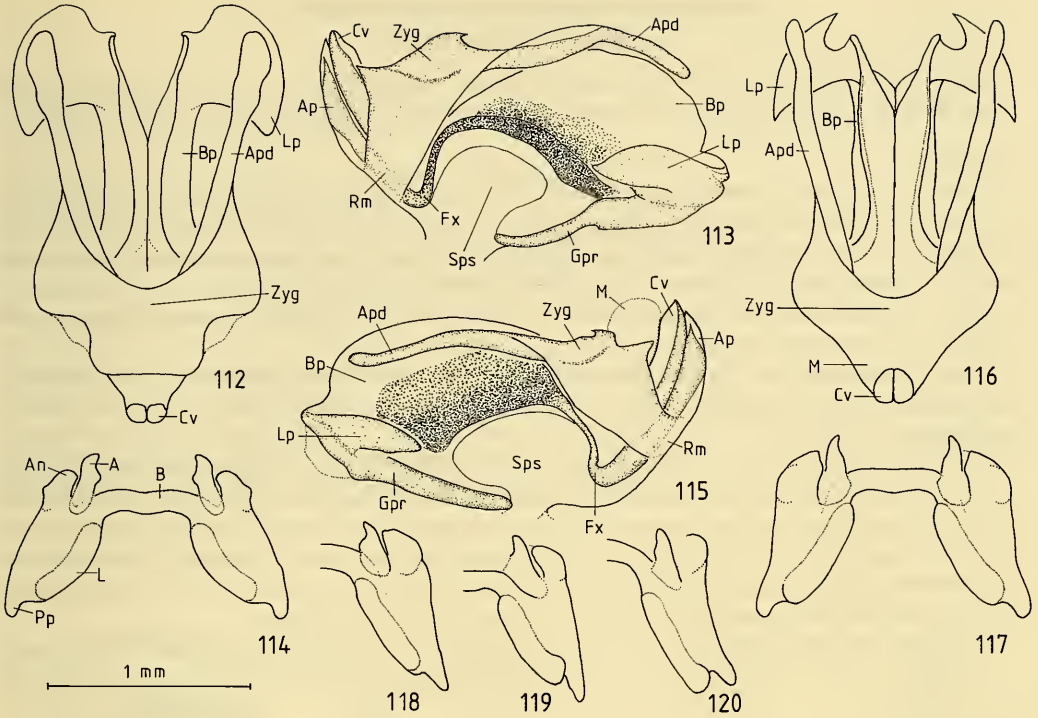
Holotype. ♂, Vietnam: Central Tonkin, Chiem-Hoa, VIII.–IX., H. Fruhstorfer, MNHB.
Material studied: Only the holotype was examined.

Description

The external morphology of the holotype has been extensively described by C. Willemse (1951). In contrast to the descriptions in Ramme (1941) and C. Willemse (1951) it should be noted that (1) the head seen strictly from above is 1.1 times longer than the pronotum and (2) the tegmina reach to the top of the hind femora.

Male. Phallic complex as in figs. 112–114. Anchorae of epiphallus hook-shaped, base enlarged; lophi simply bulging. Apical penis valves rather short and stout, slightly shorter than valves of cingulum. Basal and apical penis valves connected by a strongly curved, unbroken flexure. Lateral projections of basal penis valves rounded.

Measurements (mm): ♂: body 22; antenna broken, 12 after Ramme (1941); head from above 4.3; pronotum 4.0; tegmen 16; hind femur 12.5.



Figs 112–120. *Chlorophlaeoba* Ramme. 112–114. *tonkinensis tonkinensis* Ramme (holotype). 112. phallus in dorsal view; 113. do. in lateral view; 114. epiphallus in dorsal view. 115–118. *tonkinensis siamensis* subspec. nov.: 115–117, holotype. 115. phallus in lateral view; 116. do. in dorsal view 117. epiphallus in dorsal view; 118. right half of epiphallus in dorsal view (Phrao, paratype). 119–120. right half of epiphallus in dorsal view of males with doubtful taxonomic status (Kanchanaburi, near Phra That Cave).

Discussion

The above synonymy is due to oversights in the descriptions in Ramme (1941) and C. Willemse (1951) which have been overestimated by Zheng (1982). The author gives four features in which *C. longusala* should differ from *C. tonkinensis:* (1) head longer than pronotum, (2) the elytra of male reaching the top of hind femur, (3) hind margin of pronotum incised in the middle (almost invisible in his fig. 2), and (4) upper keel of hind femur with fine teeth. Points 1 and 2 agree completely with the holotype of *C. tonkinensis*. Plate 2 figure 1 in Ramme (1941) shows that the left tegmen reaches the top of the left but not of the right hind femur. This is due to the fact that the right hind leg is stick to the body with glue, but not in its natural position. With regard to points 3 and 4 there are slight differences. The taxonomical value of those features is doubtful, since in the subspecies from Thailand described below they vary between individuals of the same locality. Thus the description of *C. longusala* agrees fairly well with the holotype of *C. tonkinensis*. Also the figures of the phallic complex given by Zheng (1982) agree with the phallic complex of *tonkinensis*. The synonymy is thus quite certain.

Distribution

North Vietnam to Yunnan. *C. tonkinensis* has also been recorded from China by Li (1982).

Chlorophlaeoba tonkinensis siamensis subspec. nov.
(figs 108–109, 115–118)

Holotype: ♂, Northern Thailand: Phrao-District, mountains north of Phrao, 26.–29.IX.1985, ZSM. – Paratypes: Thailand: 2♂, 3♀, same data as holotype (allotype in ZSM); 3 ♂, Chiang Mai, Doi Suthep, 23.I.1987.

Description

Similar to *tonkinensis*. Head more extended in front, in dorsal view 1.2 times (rarely 1.3 times) longer than pronotum. Hind margin of pronotal disc slightly rounded, medially truncate to slightly incised. Tegmina shorter and more slender, not reaching hind knees. Hind femora with dorsal carina subsmooth to subserrate, with numerous short and less numerous longer bristles.

Male. The phallic complex (figs 115–118) agrees with that of *tonkinensis*, but lateral projections of basal penis valves with acute corners.

Female. Compared with the description given in ZHENG (1982), *siamensis* differs from *tonkinensis* in having shorter tegmina and shorter hind femora. Head in dorsal view about 1.1 times longer than pronotum.

Colouration. Similar to *tonkinensis*. General colour olivaceous green, females also ochre. Dorsum (vertex, occiput, pronotal disc, and anal field of tegmina) olivaceous green (♂), or light or dark brown (♀); occiput with black or brown postocular bands (sometimes less distinct), continued on dorsal area of paranota and lateral area of tegmina. Lateral pronotal carinae usually bordered by an additional, thin, intensely black stripe, especially in ♂. Hind femora olivaceous to yellowish green; hind knees black. Hind tibiae dirty-greenish (mostly ♂) to brown (♀), apically darker.

Measurements (mm): body ♂ 20–23, ♀ 27–30; antenna ♂ 11–12, ♀ 10–11; head from above ♂ 4.3–4.5, ♀ 5.0–5.5; pronotum ♂ 3.5–3.7, ♀ 4.6–5.2; tegmen ♂ 11–13, ♀ 13–14; hind femur ♂ 11–12, ♀ 12–14.

Discussion

The main differences to the nominate subspecies are the more extended head and abbreviated wings. Two males collected in Kanchanaburi district, western central Thailand, represent a third form of the species. The antennae and tegmina are shorter than in both of the above subspecies. The general colouration is light brown, with hind knees only faintly infumated. The phallic complex is shaped as in *siamensis* (figs 119–120). More material is needed to decide wether it is another new taxon or merely a seasonal or ecological form. It might also prove that *C. tonkinensis* is a polymorphic species with great individual variability.

Distribution

Mountains of northern Thailand, probably also along the western mountain range to central Thailand. The taxonomic status of the central Thai population should however be clarified. The grasshoppers have been found at the forest edge.

Locustinae – Epacromini

Ceracris Walker, 1870

Ceracris Walker, 1870: 721, 790.
Ceracris C. WILLEMSE 1951: 69.
Rammeacris C. Willemse, 1951: 65, syn. nov.

Type species: *Ceracris nigricornis* Walker, 1870, by monotypy.

Discussion

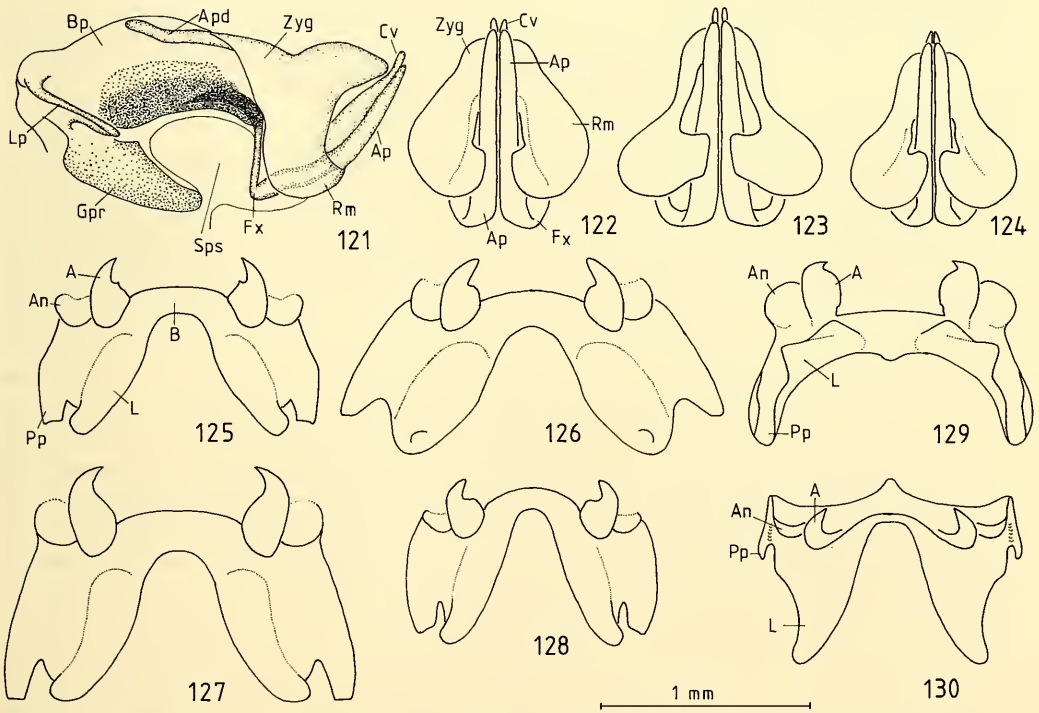
The monotypic genus *Rammeacris* becomes a synonym of *Ceracris*, since *R. gracilis* is conspecific with *C. fasciata* (see below).

Ceracris fasciata (Brunner v. W., 1893)
(figs 110–111, 121–130)

Parapleurus fasciatus Brunner v. W., 1893: 127.
Ceracris fasciata Uvarov 1925: 13, 15.
Ceracris fasciata Ramme 1941: 29.
Ceracris gracilis Ramme, 1941: 30, Taf. I, Abb. 5; syn. nov.
Rammeacris gracilis C. Willemse 1951: 66.
Ceracris fasciata C. Willemse 1951: 71 (see this paper for further synonymy).
Rammeacris gracilis F. Willemse 1967: 383, figs 6–10 (description of phallic complex).
Ceracris fasciata szemaoensis Cheng, 1977: 307, 312, fig. 18; syn. nov.
Ceracris fasciata szemaoensis Zheng 1979: 67, 69, fig. 1 (description of female).
Ceracris fasciata Roffey 1979: 114, fig. 64.

Holotype: Burma: Palon (Pegu), VIII.–IX. 1887, L. Fea, MSNG.

Additional material studied: Burma: 1♂, Hmaubi, 40 km nördl. Rangoon, IX. 1937, G. Heinrich (holotype of *C. gracilis),* MNHB. Thailand: 2♂, 1♀, south of Pattaya, 1.–3. IV. 1985; 1♂, 1♀, Doi Inthanon, Mae Klang, 25. IX. 1985; 2♂, 1♀, Phrao-District, 26.–29. IX. 1985; 1♂, 1♀, west of Chiang Mai, 30. IX. 1985; 1♂, Doi Chiang Dao, 4.–7. VI. 1986; 1♂, 1♀, Mae Hong Son, 26.–27. I. 1987 e. l.



Figs 121–130. *Ceracris fasciata* Brunner. 121. phallus in lateral view (holotype of *gracilis* Ramme); 122–124. phallus in ventro-posterior view (122. holotype of *gracilis* Ramme; 123. Mae Hong Son e. l.; 124. Pattaya); 125–128. epiphallus in dorsal view (125. holotype of *gracilis* Ramme; 126. Mae Hong Son e. l.; 127. Phrao-district; 128. holotype of *fasciata* Brunner); 129. epiphallus in posterior view (holotype of *gracilis* Ramme); 130. epiphallus in anterior view (Pattaya).

Description

For general morphology see descriptions in Uvarov (1925) or Roffey (1979). Antennae with white tips. Pronotum with lateral carinae slightly diverging to almost straigt in prozona, diverging in metazona; lateral carinae in females always more or less distinct, in males distinct (mainly in larger specimens), weakly indicated or absent (mainly in small specimens). Lateral carinae of pronotum borderd by black bands with parallel inner margins or slightly diverging craniad. Head with black postocular bands either of the same width as the black bands on pronotum or reduced to slender stripes; also transitional forms occur.

General colouration yellow to green or straw-brown. Tegmina blackish, anterior and posterior margins whitish to creamish- or greenish-white. Hind femora orange-brown with black knees and a pale pre-apical ring; hind tibiae black at the base, followed by a white ring, rest blackish-blue to brown.

Male. Epiphallus: Anchorae hooked with enlarged base; posterior process more or less grooved; lophi projecting in an almost 90°-angle, long-triangular, apex rounded. Phallus with zygoma projecting apically, almost reaching the penis apex; apodemes rather short. Valves of cingulum little surpassing the apical penis valves, both with obtuse apex. Basal and apical penis valves connected by a strongly curved, unbroken flexure. Gonopore process rather broad. Variation: Larger specimens usually have a larger phallic complex than small ones, but there is no significant difference in shape. The largest male at hand has a rather robust epiphallus (fig. 126). Zygoma and rami of cingulum are rather soft, and therefore somewhat variable in shape.

Measurements (mm):

	Type material		Material from Thailand	
	type of *fasciata*	type of *gracilis*	Males	Females
body	17	21	18 −25	23 −31
antenna	broken	10	9 −15	8 −12
pronotum	3.1	3.4	3.1− 4.5	4.4− 5.6
tegmen	12	14.5	12 −19	16 −25
hind femur	10	11	10 −14	14 −17

Discussion

C. fasciata is a highly variable species, a fact which already Ramme (1941) pointed out. Nevertheless he did not hesitate to describe a new species, *C. gracilis*, of which he believed that it differs from *C. fasciata* by colouration and size. According to Ramme (1941), *C. gracilis* should be the smallest form of the genus. However, the measurements he gives are about the same as those given by Brunner (1893) for *C. fasciata*. Indeed, the holotype of *C. fasciata* is even somewhat smaller than the type of *C. gracilis*. The holotype of *C. fasciata* is in bad condition, since it has been collected as a freshly moulted specimen. The phallus is not fully sclerotised. The epiphallus is hard enough. The epiphalli of the holotypes of *C. fasciata* and *C. gracilis* agree completely (figs 125 + 128) as do the morphological features of the body. There is no doubt that both are conspecific.

In 1951, C. Willemse erected the genus *Rammeacris*, differing from *Ceracris* by the absence of lateral carinae on the pronotum. *C. fasciata* was not known to him, but in the description that he took from Uvarov (1925), he mentioned that in *C. fasciata* the pronotal carinae are sometimes well distinct and sometimes practically absent. Indeed, already Brunner (1893) stated that the lateral pronotal carinae are distinct in the female, but absent in the male. A female of *R. gracilis* has never been described.

Cheng (1977) has described a new subspecies of *C. fasciata*, *C. f. szemaoensis*, and gives the following diagnosis: "The new subspecies is allied to *C. fasciata fasciata* (Br.-W.), but the longitudinal yellow stripe on the vertex, postvertex and pronotum with the same width; body smaller." However, this

character as well as his fig. 18 and the measurements agree exactly with the holotype of *C. fasciata*. In his figure 19, CHENG (1977) gives a drawing of head and pronotum of a specimen of which he believes that it represents typical *C. fasciata*. However this figure does not agree with BRUNNERS' type, it merely represents a colour variant which can occur everywhere together with the typical form. In the material before me, the black postocular bands vary in width and shape, even in grasshoppers from the same locality. Thus, this character is of no specific value.

Since all the authors cited above always described the smallest specimens as a new taxon, there remains a little doubt about the status of the large examples. It is probable that the variation in size (figs 110–111) and colouration is due to different ecological conditions during larval growth. Adults of this species can be found all the year round (ROFFEY 1979, supplemented by own observations). The smallest individuals at hand have been collected at the end of the dry season, they are brown. Specimens collected during the rainy season are usually larger and the green colour predominates.

Distribution

Burma, Thailand, and southern China.

Gomphocerinae

Paragonista C. Willemse, 1932

Paragonista C. Willemse, 1932: 104.
Paragonista JAGO 1971: 237.

Type species: *Paragonista infumata* C. Willemse, 1932, by original designation.

Discussion

Hitherto only one species of the genus *Paragonista* was known. UVAROV (1935) believes that the genus belongs to the group *Chrysochraontes* (now tribus *Chrysochraontini)* and comes near *Mongolotettix*, while after JAGO (1971) it is probably a basic member of the *Brachycrotaphus-Mesopsis-Baidoceracris-Klelacris* complex. It is striking that species of *Paragonista* possess both, stridulatory pegs on the interior area of the hind femora (as characteristic of Gomphocerinae) and a vena intercalaris in the medial area of the tegmina (as characteristic of Locustinae). Stridulation and behaviour have not yet been studied.

Key to the species of *Paragonista* (males only)

1. Face with frontal ridge in lateral view ± straight (fig. 131). Medial area of tegmina with a short vena intercalaris; cubital area with regular oblique veinlets (fig. 143). Internal area of hind femora with 97–108 stridulatory pegs. South China . . . . . *infumata* C. Willemse, 1932

– Face with frontal ridge in lateral view subconcave (fig. 137). Medial area of tegmina with a long vena intercalaris; cubital area with irregular, cross veinlets (fig. 144). Internal area of hind femora with 150–186 stridulatory pegs. Northern Thailand . . . . . *hyalina* spec. nov.

Paragonista infumata C. Willemse, 1932
(figs 131–136, 143)

Paragonista infumata C. Willemse, 1932: 104.

Holotype (not seen): China, prov. Kiangsu, leg. Kolthoff, Museum Stockholm.
Material studied: Paratypes: 2♂, 1♀, same data as holotype, NMM.

Description

For general morphology and measurements see description in C. Willemse (1932). Tegmina 6 times longer than broad; maximum width of costal area 0.66–0.72 mm, of medial area 0.26–0.33 mm, and of cubital area 0.66 mm. Interior area of hind femora with 97–108 (mean 104) stridulatory pegs in male; in the female with 115–117 bristles, stout in the middle, thin at both ends of the row.

Male. Epiphallus bridge-shaped; anchorae flexed, in lateral view pointed; anterior projections bulging; posterior projections small; with two pairs of lophi, outer lophi long extending with a lateral bulge, inner lophi about oval. Cingulum with zygoma, rami and apodemes; apodemes upcurved; rami thin membranous in lower half (the membranous part of rami and another thin membrane covering bases of apical penis valves have been removed during preparation and are not drawn in fig. 133). Cingular valves and apical penis valves slender. Basal and apical penis valves connected by a sharply curved, unbroken flexure. Lateral projection of basal penis valves mussel-shaped.

Distribution

China: Province Kiangsu, Hainan (Uvarov 1935).

Paragonista hyalina spec. nov.

(figs 137–142, 144–145)

Holotype: ♂, Northern Thailand, west of Chiang Mai, near Huei Keo waterfall, teak wood forest, 12.IV.1985, ZSM. – Paratypes: 1 ♂, same data as holotype; 2 ♂, same locality as holotype, 23.I.1987.

Description

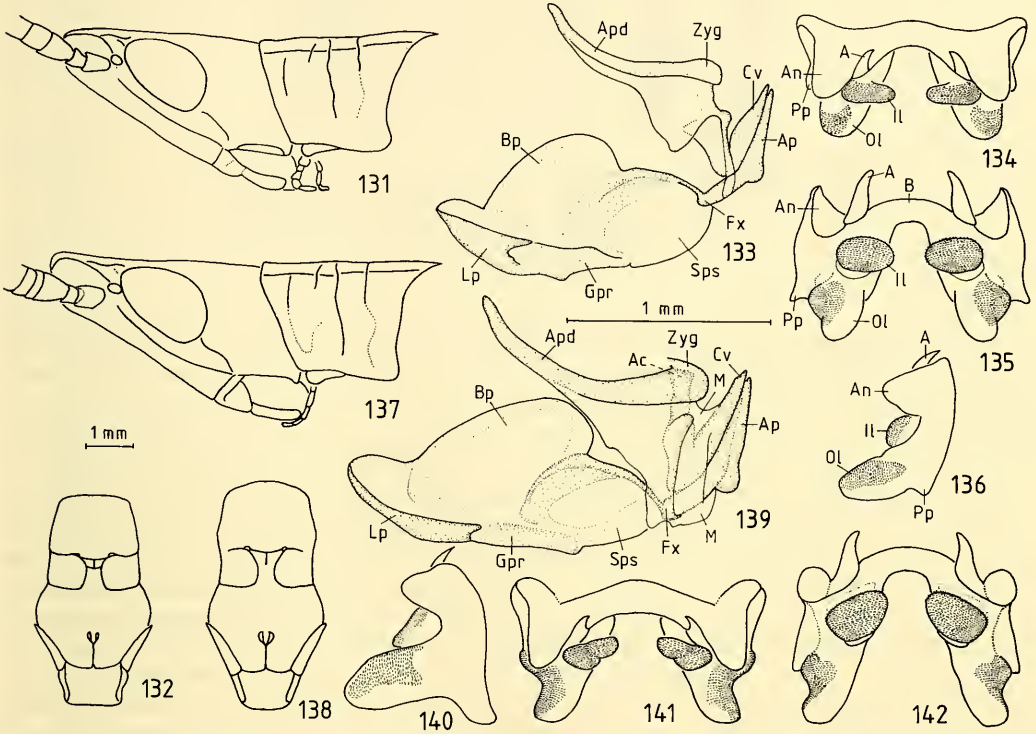
Antennae ensiform, in apical half with joints more elongate, apical joint pointed; distinctly longer than head and pronotum together; inserted in front of the lateral ocelli, which lay in front of the compound eyes. Face strongly reclinate; frontal ridge prominent, in lateral view subconcave, projecting between antennae, subobsolete just above clypeal ridge, sulcate throughout, widening below median ocellus. Lateral fascial carinae distinctly bent. Temporal foveolae absent or very indistinct. Fastigium of vertex forming an acute angle with frontal ridge, anterior margin rounded, separated from vertex by a semicircular impression in front of the eyes; dorsum of head with indication of a median carinula.

Pronotum with a median carina and straight lateral carinae, very slightly widening posteriorly, almost parallel-sided; anterior margin truncate to very slightly concave, posterior margin triangularly rounded. First (= submarginal) sulcus only on paranota, though in some individuals cutting the lateral carinae, second and third sulci not cutting median carina; fourth (= principle) sulcus at the end of the sixth tenth of pronotal length, indistinct on paranota. Paranota somewhat longer than high. Prosternum slightly bulging. Mesosternal interspace longer than broad, inner margins of mesosternal lobes convex; metasternal lobes contiguous.

Tegmina seven to eight times longer than broad; reaching or surpassing middle of hind tibiae; maximum width of costal area 0.52 mm, of medial area 0.26 mm, and of cubital area 0.45–0.50 mm; medial area with a long vena intercalaris; cubital area with irregular, cross veinlets. Flexed hind wings as long as tegmina or 0.5 mm shorter. Anterior and median legs short. Hind femora short, slender, carinae smooth; interior area with a bent row of 150 to 186 (mean 169) stridulatory pegs; ventral genicular lobes rounded. Hind tibiae with 10–13 external and 12–15 internal preapical spines; without external apical spine.

Male. Tenth tergum lateral, with indications of furculae only. Supra anal plate long-triangular, apex rounded, with a longitudinal median groove, lateral margins with a subapical incision. Cerci slender, very slightly surpassing apex of supra anal plate; apex obtuse. Subgenital plate long, with a transverse fold, apex obtusely pointed.

Phallic complex very similar to that of P. infumata, but more robust. Epiphallus bridge-shaped; anchorae flexed, in lateral view pointed; anterior projections bulging; posterior projections small; with two pairs of lophi, outer lophi long extending with a lateral bulge, inner lophi about rounded-trapezoid. Cingulum with zygoma, rami and apodemes; apodemes upcurved; rami thin-membranous in ventral half, apically connected with a thin membrane covering bases of cingular valves and apical penis valves. Basal and apical penis valves connected by a sharply curved, unbroken flexure. Lateral projection of basal penis valves mussel-shaped.



Figs 131–136. *Paragonista infumata* C. Willemse ♂ (paratype). 131. head and pronotum; 132. meso- and metasternum; 133. phallus in lateral view; 134. epiphallus in anterior view; 135. do. in dorsal view; 136. do. in lateral view.

Figs 137–142. *Paragonista hyalina* spec. nov. ♂ (holotype). 137. head and pronotum; 138. meso- and metasternum; 139. phallus in lateral view; 140. epiphallus in lateral view; 141. do. in anterior view; 142. do. in dorsal view.

Colouration. General colour yellowish brown to greenish; dorsum of head, pronotum, temina, and a median band on terga light brown with some dark spots to blackish brown. Antennae reddish brown (discoloured?) to dark brown with white tips. Face and sides of thoracic sterna (sometimes also of abdominal sterna) of the same colour as dorsum; legs of general colouration. Tegmina almost hyaline, slightly brown in dorsal (= posterior) half; in individuals with dark dorsum darker, less hyaline; hind wings hyaline, clear to slightly infumate towards apex.

Female unknown.

Measurements (mm): ♂: body 22–25; antenna 10–11; pronotum 3.4–3.6; tegmen 17.5–17.7; hind femur 9–10.

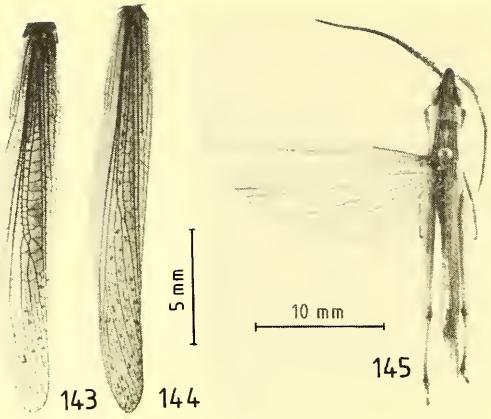


Fig. 143. *Paragonista infumata* C. Willemse: left tegmen of ♂ (paratype).
Fig. 144. *Paragonista hyalina* spec. nov. left tegmen of ♂ (paratype).
Fig. 145. *Paragonista hyalina* spec. nov. ♂ (holotype).

Discussion

General morphology and the phallic complex of the new species are similar to *P. infumata*. The main differences are given in the key. Additional differences are the shape of the body, which is somewhat broader in *hyalina*, the shape of the tegmina and the proportions of the different areas, the shape of the mesosternal lobes, broader hind wings and a slightly stouter phallic complex in *hyalina*. There is a clear difference in the number of stridulatory pegs. It may thus be concluded that stridulation and behaviour, important diagnostic features in Gomphocerinae, differ between both species.

Another striking difference between both species has not been included in the key, because it cannot be excluded that the difference is due to individual variation. The hind wings are strongly infumate in *infumata*, but almost completely colourless in *hyalina*. *P. hyalina* has been collected during and at the end of the dry season. At the end of the rainy season, I collected another male together with two females at the type locality. All have infumate hind wings. The male shows some additional differences to the description given above, concerning mainly shape of head and tegmina, number of stridulatory pegs (134–148), and mesosternal lobes. The differences are however not very great. Further studies are necessary to decide whether they are due to individual variation, or if the male with infumate hind wings represents a seasonal form or a distinct species. Since the status of the male is uncertain, the females collected together with that male have not been described above.

Distribution

The species is only known from the type locality in the environs of Chiang Mai, where it lives in the grassy undergrowth of a teak wood plantation.

Literature

Brunner von Wattenwyl, C. 1893. Revision du systeme des Orthopteres et description des especes rapportees par M. Leonardo Fea de Birmanie. – Annali Mus. Civ. Stor. Nat. Genova, Ser. 2a, 13, 1–230, Tav. I-VI

Cheng, T.-M. 1977. New genera and new species of Acrididae from Yunnan-Kweichow plateau, China. – Acta ent. sinica 20, 303–313

Deshmukh, I. 1986. Ecology and tropical biology. Palo Alto, Oxford, London (Blackwell)

Dirsh, V. M. 1956. The phallic complex in Acridoidea (Orthoptera) in relation to taxonomy. – Trans. R. Ent. Soc. London 108, 223–356, pl. 1–66

—— 1961. A preliminary revision of the families and subfamilies of Acridoidea (Orthoptera, Insecta). – Bull. Brit. Mus. Nat. Hist. (Ent.) **10**, 351–463
—— 1975. Classification of the acridomorphoid insects. – Faringdon, Oxon (E. W. Classey): 1–171
Hollis, D. 1970. A revision of the genus *Tristria* (Orthoptera: Acridoidea). – J. Nat. Hist. **4**, 457–480
—— 1975. A review of the subfamily Oxyinae (Orthoptera: Acridoidea). – Bull. Brit. Mus. Nat. Hist. (Ent.) **31**, 189–234
Huang, C.-M. 1985. Two new species of *Carsula* Stål from Yunnan, China (Orthoptera: Acrididae, Catantopinae). – Acta ent. sinica **28**, 212–214
Jago, N. D. 1966. A key, check list and synonymy to the species formerly included in the genera *Caloptenopsis* I. Bolívar, 1889, and *Acorypha* Krauss, 1877 (Orth. Calliptaminae). – Eos (Madrid) **42**, 397–462
—— 1971. A review of the Gomphocerinae of the world with a key to the genera (Orthoptera, Acrididae). – Proc. Acad. Nat. Sci. Philadelphia**123**, 205–343
Kevan, D. K. McE., + S. K. Lee. 1974. Changes in the phallic complex of adult *Atractomorpha sinensis sinensis* (Orthoptera: Pyrgomorphidae). – Can. Ent. **106**, 645–650
Li, T.-S. 1982. New records of grasshoppers from China. – Entomotaxonomia **4**, 258
Miller, N. C. E. 1935. New and little known Malayan Acrididae. – J. Fed. Malay St. Mus. **17**, 686–709, pl. 14
Ramme, W. 1941. Beiträge zur Kenntnis der Acrididen-Fauna des indomalayischen und benachbarter Gebiete (Orth.). – Mitteilungen Zool. Mus. Berlin **25**, 1–243, Taf. I–XXI
Roffey, J. 1979. Locusts and grasshoppers of economic importance in Thailand. – Anti-Locust Mem. **14**, 1–200
Serville, M. A. 1839. Histoire naturelle des insectes. Orthopteres. – Paris, 1–776, pl. 1–14
Stål, C. 1875. Observations orthopterologiques 1. – Bih. till K. Svensk Vet. Akad. Handl.
—— 1878. Systema Acridiodeorum. – Bih. Svensk Akad. Handl. **5**, 1–100
Uvarov, B. P. 1925. A revision of the genus *Ceracris* Walk. (Orthopt. Acrid.). – Ent. Mitt. **14**, 11–17
—— 1935. Notes on Acrididae from South China. – Lignan Sci. J. **14**, 267–269
—— 1951. The genus *Caloptenopsis* I. Bolívar and its allies (Orthoptera, Acrididae). – Eos (Madrid), Sonderband 1950, 385–413
Vickery, V. R. + D. K. McE. Kevan 1983. A monograph of the orthopteroid insects of Canada and adjacent regions. Vol. I + II. Mem. Lyman Ent. Mus. Res. Lab. **13**, 1–680 + 681–1467
Walker, F. 1870–71. Catalogue of the specimens of Dermaptera Saltatoria in the collection of the British Museum. Part. III, IV, V, and supplement; London
Willemse, C. 1922. Description de trois nouveaux genres d'Orthoptères fam. Acridiens, sous-famille Cyrtacanthacrinae de Borneo, de Celebes et de Tonkin. – Ent. Mitt. **11**, 3–8, Taf. I
—— 1931. Orthoptera Celebica Sarasiniana. I. Saltatoria, Fam. Acrididae. – Treubia **12**, Suppl., 189–270
—— 1932. Description of some new Acrididae (Orthoptera) chiefly from China from the Naturhistoriska Riksmuseum of Stockholm. – Natuurh. Maandblad **21**, 104–107
—— 1933. Description of new Indo-Malayan Acrididae (Orthoptera) Part I. – Natuurhist. Maandblad **22**, 73–76
—— 1951. Synopsis of the Acridoidea of the Indo-Malayan and adjacent regions (Insecta, Orthoptera), Part I. Fam. Acrididae, subfam. Acridinae. – Publicaties Natuurhist. Genootschap Limburg **4**, 41–114
—— 1955. Synopsis of the Acridoidea of the Indo-Malayan and adjacent regions (Insecta, Orthoptera), Part II. Fam. Acrididae, subfam. Catantopinae, part one. – Publicaties Natuurhist. Genootschap Limburg **8**, 3–225
—— 1957. Synopsis of the Acridoidea of the Indo-Malayan and adjacent regions (Insecta, Orthoptera), Part II. Fam. Acrididae, subfam. Catantopinae, part II. – Publicaties Natuurhist. Genootschap Limburg **10**, 227–500
Willemse, F. 1963. A new species of the genus *Bettotania* Will. (Orthoptera, Acridoidea, Acrididae, Catantopinae). – Natuurhist. Maandblad **52**, 171–173
—— 1965. Orthoptera, Acridoidea chiefly from Java in the Zoologisches Staatsinstitut und Zoologisches Museum of Hamburg. – Ent. Mitt. Zool. Staatsinst. Zool. Mus. Hamburg **3**, 53–67
—— 1967. Additional data on some genera and species of Acrididae (Orthoptera, Acridoidea) from the Indo-Malayan region. – Tijds. Ent. **110**, 381–397, pl. 18–19
Zheng, Z.-m. 1979. Descriptions of the female of *Ceracris fasciata szemaoensis* Zheng and *Choreodocus violaceipes* Miller from China. – Entomotaxonomia **1**, 67–69
—— 1980. New records of grasshoppers from China. – Entomotaxonomia **2**, 116, 130
—— 1981. New genus and new species of grasshoppers from Xishuangbanna, China. – Acta ent. sinica **24**, 295–304
—— 1982. New genus and new species of grasshoppers from Yunnan, Guizhou and Sichuan, China (III). – Zool. Res. **3**, 83–87

—— 1983 New species and subspecies of grasshoppers from Sichuan and Yunnan, China. – Acta zootaxon. sinica **8**, 407–412
ZHENG, Z.-m., + G.-Q. LIANG, 1986. New species of grasshoppers from Yunnan and Guizhou. – Acta ent. sinica **29**, 291–294

Dr. Sigfrid Ingrisch
Institut für Zoologie der RWTH
Kopernikusstr. 16
D-5100 Aachen